

Fish assemblages at Julian Rocks and the adjacent waters of northern New South Wales, Australia

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ABSTRACT

A survey of fish species occurring in the marine waters of northern New South Wales was conducted at five sites between October 1988 and February 1996. The principal study site was at Julian Rocks, located approximately five km north of Cape Byron, Australia's most easterly mainland point. The other study sites included: Windarra Bank, located 16 km east of Mooball; Wilsons Reef, located 2 km south-west of Julian Rocks; Lennox Head Moat located at the southern extreme of Seven Mile Beach, Lennox Head and Belongil Creek, located two km west of Byron Bay township.

A total of 530 fish species in 293 genera and 115 families was recorded from the study area. The total was composed of 394 (74.3%) tropical species, 103 (19.4%) temperate species and 31 (5.8%) subtropical species. The remaining two (0.4%) species have circum-global or circum-Australian distributions.

Eighty-four (15.8%) of the species recorded are restricted to the South-Western or South Pacific Oceans and 96 (18.1%) are endemic to Australia. The endemics comprised: 19 (3.6%) tropical species; 48 (9.1%) temperate species; and 29 (5.5%) subtropical species. Two (0.4%) of the species recorded occur in both tropical and temperate seas and two species are primarily freshwater fish, one of which, *Gambusia holbrooki* (mosquito fish) is introduced.

The 394 tropical species dominated the fish assemblage at the study sites. However, when the relative abundances of tropical, subtropical and temperate fish species are compared, the percentage of "common" tropical species (6.3%) was significantly less than the "common" subtropical (38.7%) or "common" temperate (19.4%) counterparts.

The most speciose families were: Labridae (74 species); Pomacentridae (43); Chaetodontidae (26); Serranidae (24); Acanthuridae (19); Monacanthidae (16); Carangidae (16); Scorpaenidae (14); Pomacanthidae (13); Scombridae (13) and Tetraodontidae (13).

A total of 114 (21.5%) tropical species in 31 families had not previously been recorded from New South Wales. Similarly, 12 (2.2%) temperate species in 10 families had not previously been recorded as far north as the study area.

INTRODUCTION

The Australian coastal zone supports some of the richest fish habitats in the world. A total of 3 870 fish species (D. Bray, Australian Museum, pers. comm.) places the Australian total near that recorded for the Japanese Archipelago (approximately 3 500) and Indonesia (>3 000) (Paxton *et al.* 1989) and approaches that known for the entire Indo-Pacific region (4 000 species) (Myers 1989). The large number of fish species in Australian waters relates to the wide latitudinal range of habitats available (10°–45°S), the inclusion of fishes located along the length of the Great Barrier Reef (GBR) and the radiation of a number of temperate fish families (Paxton *et al.* 1989). Australian fish assemblages include tropical and temperate species. Intermixing and local endemism of these species occurs within a transitional or subtropical zone.

The study area was centrally located on the eastern Australian coastline within the transition zone known as the Eastern Overlap Zone. This zone extends from Yeppoon,

Queensland (23°08'S) in the north, to Seal Rocks (32°28'S), New South Wales (Wilson and Allen 1987).

Many of the fish species recorded in the Eastern Overlap Zone are distributed throughout the Indo-West Pacific to Japan and into the Central-Pacific. A number of zoogeographic zones have been recognized for these waters (e.g., Paxton *et al.* 1989 reproduced as Fig. 1). In some cases, these zoogeographic zones have been subdivided into biogeographical regions or provinces (Hedley 1926; Whitley 1932; Bennet and Pope 1953, cited in Wilson and Allen 1987; Briggs 1974). However, these regions or provinces were based on the then available distributional evidence which was not supported by taxonomic revisions (Wilson and Allen 1987) or additional fish collections (Allen *et al.* 1976).

There have been few comprehensive studies of the fishes of northern New South Wales or the more extensive Eastern Overlap Zone. Various researchers have conducted fish surveys and incorporated their records into

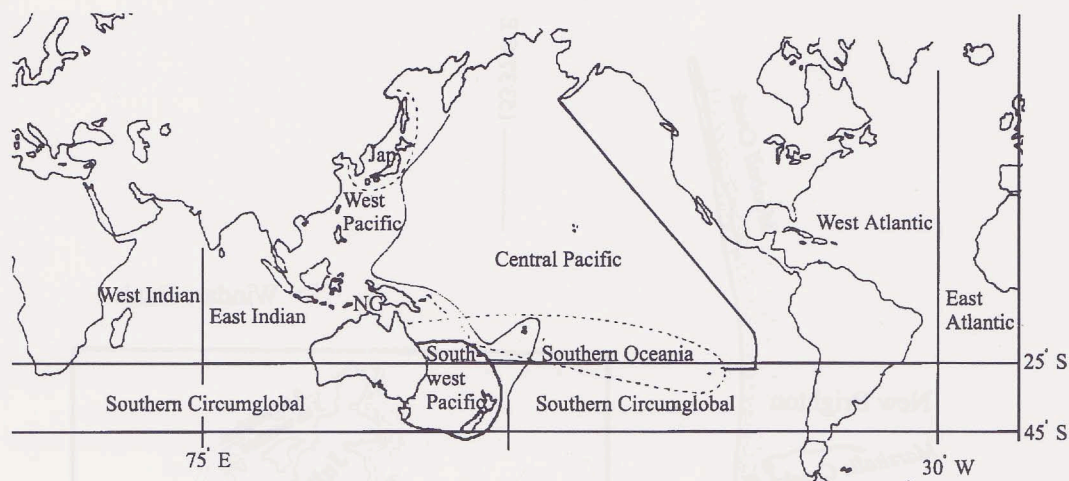


Figure 1. Major zoogeographic areas (after Paxton *et al.* 1989).

pictorial guides. For example, Hutchins (unpubl. data) surveyed the coastal fishes of northern New South Wales in 1981 and much of his data was incorporated in Hutchins and Swainston (1986) and Hutchins (1994). The diversity of fishes was described for Lord Howe Island by Allen *et al.* (1976); Francis (1993) and Francis and Randall (1993) and for Elizabeth and Middleton Reefs by Gill and Reader (1992). The *Zoological Catalogue* (Paxton *et al.* 1989) and popular texts (e.g., Grant 1985; Coleman 1986a,b; Allen and Swainston 1988; Randall *et al.* 1990, 1997; Kuiter 1992, 1993; Last and Stevens 1994; Gomon *et al.* 1994) all provided species descriptions and, in most cases, photographs. However, these publications provided few details on the regional abundances of fish species and did not describe the attenuated southerly ranges of many tropical species.

A long-term fish survey at Julian Rocks was intended to provide fish distribution and abundance data on the central region of the Eastern Overlap Zone. The compilation of an annotated fish checklist for this area is an important contribution to the records of east-coast Australian fishes and provides details on many of the tropical species whose range extends into New South Wales.

METHODS AND STUDY SITES

The major survey effort by the author was concentrated within the waters immediately surrounding Julian Rocks off Byron Bay in northern New South Wales (28°36.8'S, 153°37.6'E). Other sites included: the Belongil Creek, located two km north-west of Byron Bay township; Lennox Head Moat (28°48.2'S, 153°36.55'E), located at the southern extreme of Seven Mile Beach, Lennox Head; Wilsons

Reef (28°37.43'S, 153°36.57'E) located west of Julian Rocks and Windara Bank (28°27.6'S, 153°41.4'E) located near the edge of the continental shelf (Fig. 2). Each of these sites is described below.

Julian Rocks

The Julian Rocks Nature Reserve includes two rocky pinnacles named Juan and Julia. It lies above the high water mark, measures 0.4 ha in area and is comprised of metamorphosed Paleozoic sediments (metasediments) of the Neranleigh-Fernvale Group. These sediments are deformed schistose siltstones inter-bedded with minor sandstones and volcanics. The steep cliff faces of Julian Rocks can be seen from Cape Byron. These rise abruptly from the sea-floor and extend to 19 m above the high water mark on Juan, the taller of the two pinnacles. The seabed surrounding Julian Rocks is a composite mixture of sand, rubble, broken rock and boulders, rocky pinnacles and crevices.

The 80 ha Julian Rocks Aquatic Reserve was gazetted in 1982 and extends 500 m seawards of a trigonometric station located on Juan. Collecting, spearfishing, netting and trapping is prohibited within the Julian Rocks Aquatic Reserve, although limited line fishing is permitted.

Random fish surveys commenced during October 1988 at locations that included caves and crevices, sandy trenches, small pinnacles and rocky gutters. Survey locations ranged from the high water mark of Julian Rocks to approximately 100 m seawards and to a depth of 24 m. Monthly visual transects commenced in January 1990 and continued until April 1991 at the seven study sites illustrated in Figure 2. Visual transects were resumed in October 1991 and continued until March 1992

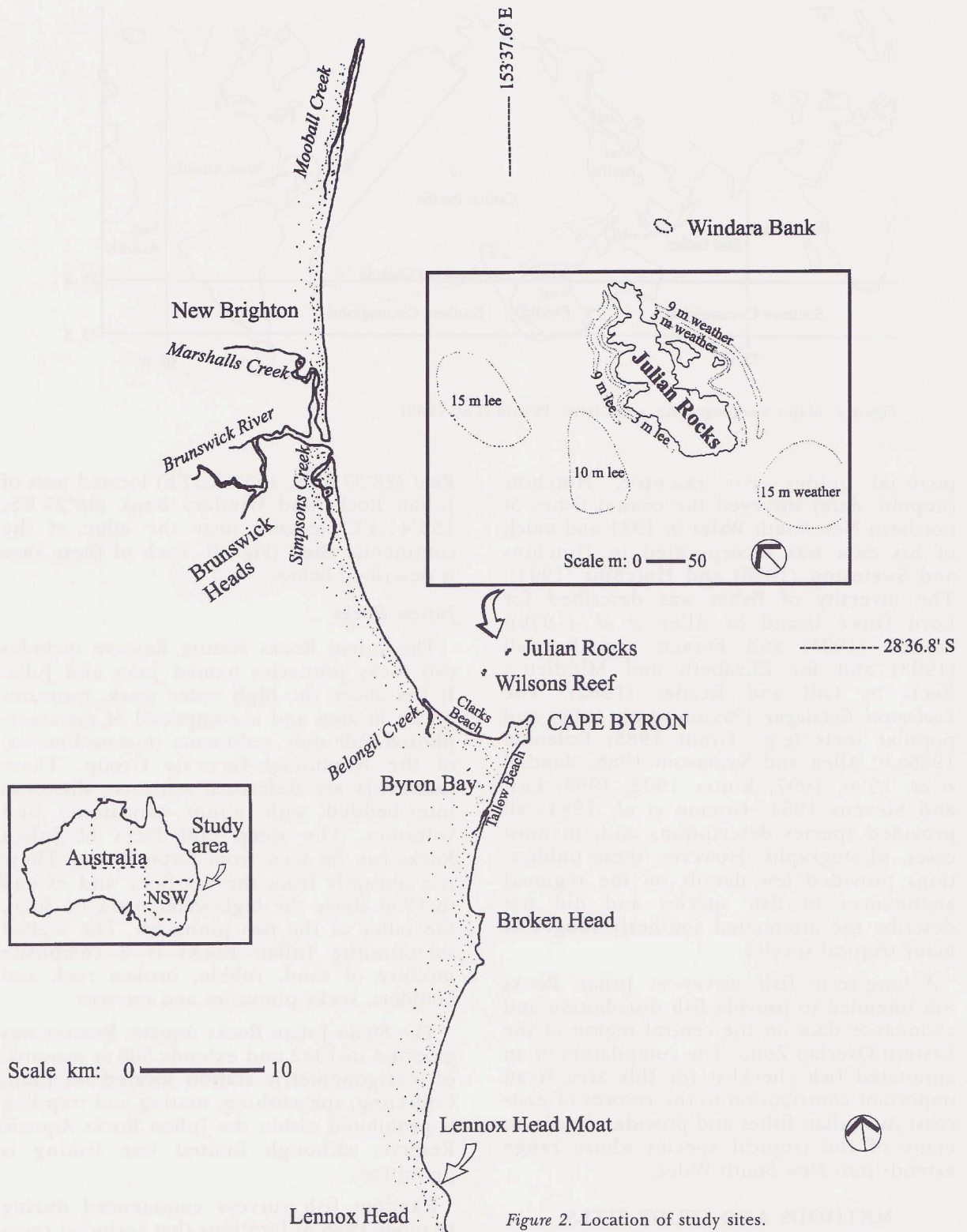


Figure 2. Location of study sites.

in order to incorporate three consecutive summers of data.

The study sites were selected for their homogeneity and suitability for randomly placed replicate transects. The seven sites comprised: two at a depth of three metres and

two at a depth of nine metres on the lee and weather cliff sides respectively; two at a depth of 15 m on the lee and weather sides approximately 60–80 m from Julian Rocks; and one at a depth of 10 m on the lee side approximately 40 m from Julian Rocks (Fig. 2).

Windarra Bank

Windarra Bank is located approximately 16 km east of Mooball (Fig. 2). This site contained prominent sea-mounts rising from the sea-floor at 43 m to approximately 23 m depth. Data was only collected at Windarra Bank during the winters of 1990 and 1992 due to the strong currents experienced during the summer months.

Wilsons Reef

Wilsons Reef is located approximately 2 km south-west of Julian Rocks and is comprised of a rocky outcrop that rises several metres above the sea floor at 15 m depth (Fig. 2). Sampling using visual transects was undertaken during March, May, September, November and December 1990.

Lennox Head Moat

Lennox Head Moat is a shallow lagoon (0.5–2 m depth) located landward of Lennox Head fringing reef (Fig. 2). A random timed survey of 45 minutes duration was undertaken in November 1990 and monthly between November 1991 to April 1992.

Belongil Creek

Belongil Creek is an intermittently open estuary containing sandy beaches and mud flats. It is fed by the Cumbebin Swamp located approximately 1 km west of Byron Bay township (Fig. 2). The primary sampling method at this site was a 20 m × 1 cm, 100 mesh seine net hauled at six sites by two persons with several additional persons "splashing" to direct fish. Sampling was undertaken at near-low tide on 6 November 1995, 4 December 1995, 16 January 1996 and 13 February 1996 in water up to a depth of 1.5 m. Other sampling methods included gill nets, a dip-net and snorkelling of the lower reaches. Two 10 m × 6 cm and 10 m × 2 cm mono-filament gill nets were set at one site on 10 November 1995. A 0.45 m diameter dip-net was dragged opportunistically through two small areas of seagrass (*Zostera capricorni*) and an underwater visual census was undertaken from the Creek mouth upstream for approximately 100 m on 10 November 1995.

Data recording

Data were recorded on an underwater slate which was inscribed with the names of the most common fish species which occurred in the study area. Additional species were added when encountered and the tally for each species was placed in a column next to its name. Four replicate stratified random

transects of 5 × 30 m (150 m²) for adults and 2 × 30 m (60 m²) for juveniles were adopted on each survey-day. Variations to this method for Lennox Head Moat and the Belongil Creek are described above.

Transects utilized a 2 mm diameter nylon cord rolled on to a 25 cm fishing reel. The leading end of the cord and the centre of the fishing reel were both weighted with 0.5 kg of lead to secure the cord rapidly prior to the commencement of each transect. The line was laid-out by swimming slowly along the relevant isobath within the selected site. Recording commenced approximately one minute after the line was secured by swimming at a constant speed along the transect line. Juveniles were sampled after the adult counts. On completion, the transect line was rewound and any juveniles not sighted previously were noted. This procedure reduced the possibility of underestimating abundance (see Sale and Sharp 1983).

Records were supplemented with the photographic collections of recreational divers and the catch of professional and recreational fishers viewed by the author.

The identification of fish species was based on illustrations and descriptions in Hutchins and Swainston (1986); Allen and Swainston (1988); Randall *et al.* (1990, 1997); Fautin and Allen (1992); Kuitert (1993); Heemstra and Randall (1993) and Last and Stevens (1994). Scientific papers were utilized for more specific information (e.g., Allen and Hoese 1975) and voucher specimens were forwarded to the Queensland and Australian Museums for specialist identification. Juveniles that were difficult to identify to species level were collected and observed in a marine aquarium or forwarded to the Australian Museum.

Nomenclature

The taxonomic arrangements of families, genera and species follow those adopted by Paxton *et al.* (1989), although sharks and rays follow Last and Stevens (1994).

Fish abundance and maturity

Fish were placed into four abundance classes. These classes generally follow Allen *et al.* (1976) and Russell (1983) and are listed in Appendix 1. Maturity classes were assessed by comparing the size and colour pattern of the fish with published records (e.g., Grant 1985; Coleman 1986a,b; Hutchins and Swainston 1986; Allen and Swainston 1988; Burgess *et al.* 1988; Randall *et al.* 1990; Fautin and Allen 1992; Kuitert 1993; Last and Stevens 1994; Gomon *et al.* 1994). Most fish were recorded as adults or sub-adults and

no size class has been provided. However, the total length was noted for juveniles when no adult was recorded (e.g., see *Antennarius nummifer*, *Lutjanus bohar*).

RESULTS

A total of 530 species in 293 genera and 115 families was recorded for the study area. These comprised: 394 (74.3%) tropical species; 103 (19.4%) temperate species; and 31 (5.8%) subtropical species. The remaining two (0.4%) species had circum-global or circum-Australian distributions (Appendix 1).

A total of 84 (15.9%) species was restricted to the South-Western or South Pacific Oceans and 96 species (18.1%) were endemic to Australia (see Paxton *et al.* 1989; Randall *et al.* 1990; Kuiter 1993; Gomon *et al.* 1994; Last and Stevens 1994). The endemics comprised: 19 (3.6%) predominantly tropical species; 48 (9.1%) temperate species; and 29 (5.5%) subtropical species. Two (0.4%) of the species recorded occur in both tropical and temperate seas and two species are primarily freshwater fish, one of which *Gambusia holbrooki* is introduced (Table 1).

The most speciose families were: Labridae (74 species); Pomacentridae (43); Chaetodontidae (26); Serranidae (24); Acanthuridae (19); Monacanthidae (16); Carangidae (16); Scorpaenidae (14); Pomacanthidae (13); Scombridae (13); and Tetraodontidae (13).

There were comparatively few species recorded for the family Gobiidae (11 or 2.1%). Despite being the world's most speciose marine fish family it was largely unsampled in the visual transects due to the cryptic or burrowing behaviour of most gobiids. The number of gobiids overlooked may be quite significant. For example, 104 gobiids were recorded for the Capricorn Section of the GBR (Russell 1983), over 200 species are known from the Coral Sea (Randall *et al.* 1990) and 341 species occur in Australian waters (Gomon *et al.* 1994). Other families that may also be under-sampled include the Tripterygiidae and the Blenniidae. Like the gobiids, many of these species are small and cryptic and are unlikely to be efficiently sampled by visual methods.

Certain taxa were conspicuously absent when compared to sampling undertaken at coral reef areas to the north of the study site (Russell 1983), at Lord Howe Island (Allen *et al.* 1976), or at Elizabeth and Middleton Reefs (Gill and Reader 1992) located approximately 500 km east of Coffs Harbour. The most notable of these taxa was the scarids, of which only five species were recorded at Julian Rocks. By contrast, 24 scarids were recorded from the Capricorn-Bunker group on the southern GBR (Russell 1983; Lowe and Russell 1990), 13 from Lord Howe Island (Francis 1993) and 16 from Elizabeth and Middleton Reefs (Gill and Reader 1992).

Table 1. Zoogeographic analysis of the fish fauna of northern New South Wales including a breakdown of the six most speciose families (Lab: Labridae; Pom: Pomacentridae; Cha: Chaetodontidae; Ser: Serranidae; Ac: Acanthuridae; Mon: Monacanthidae). Zoogeographical regions follow Paxton *et al.* (1989). Distributions follow Paxton *et al.* (1989), Randall *et al.* (1990), Kuiter (1993), Last and Stevens (1994) and Gomon *et al.* (1994).

Distribution	No. of species	% of species	Lab.	Pom. (percentages show proportion of family)	Cha.	Ser.	Ac.	Mon.
CIRCUM (cir.-global or sth.-cir.-global)	31	5.8						2(13%)
CP (Central Pacific)	6	1.1	2(3%)			1(4%)		
CWP (Central-West Pacific)	8	1.5		3(7%)	2(8%)		1(5%)	
ISWP (Indo-South-West Pacific)	34	6.4	3(4%)	1(2%)				3(20%)
IWCP (Indo-West Central Pacific)	182	34.3	37(50%)	9(20%)	15(58%)	2(9%)	14(74%)	3(20%)
IWP (Indo-West Pacific)	128	24.1	9(12%)	11(25%)	5(19%)	12(52%)	2(10%)	3(20%)
IWSWP (Indo-West and South-West Pac.)	11	2.1	4(5%)	1(2%)				
SWP (South-West Pacific)	84	15.8	11(15%)	7(16%)	2(8%)	6(26%)	1(5%)	3(20%)
WCSWP (West-Cent. and South-West Pac.)	4	0.7	2(3%)	1(2%)				
WP (West Pacific)	16	3.0	1(1%)	3(7%)	1(4%)	1(4%)		
WSWP (West and South-West Pacific)	25	4.7	5(7%)	8(19%)	1(4%)	1(4%)	1(5%)	1(6%)
Introduced	1	0.2						
Total number of species	530	99.7	74	44	26	23	19	15

Fish abundance

The fish assemblage recorded from the study area was dominated by relatively few species. According to the abundance categories adopted for this survey (Appendix 1), 57 (10.7%) species were common, 132 (24.9%) were occasional, 268 (50.6%) were uncommon and 73 (13.8%) were rare (Table 2).

The percentage contribution to the total of species within the "common" category varied considerably for fish of tropical, subtropical and temperate origin. Common subtropical species comprised the highest component and accounted for 38.7% (12 species) of the subtropical category. Common tropical and temperate species, however, comprised only 6.3% (25 species) and 19.4% (20 species) of their respective category (Table 2). Furthermore, the trend for fish in the "occasional", "uncommon" and "rare" categories to dominate the assemblage was consistent among the six most speciose families (Table 3).

Comparison between nearshore and offshore sites

A meaningful comparison of fish assemblages between nearshore and offshore sites was confounded by the limited data collected from Windara Bank. However, several species were recorded from locations other than Julian Rocks and were considered characteristic of these additional habitats (Table 4). Two species not recorded at Julian Rocks were recorded at Windara Bank, six additional species were recorded at Wilsons Reef, 11 additional species were recorded at Lennox Head and 15

primarily estuarine species were recorded from the Belongil Creek. An additional 15 species were sighted by the author in the catches of local fishers (Appendix 1).

Windara Bank supported large schools of carangids, especially *Caranx sexfasciatus* (bigeye trevally), *Elagatis bipinnulatus* (rainbow runner) and *Seriola lalandi* (yellowtail kingfish). The most conspicuous fishes, however, were recorded from rocky pinnacles and sandy gutters. These were *Carcharhinus plumbeus* (sandbar shark) and *Carcharhinus taurus* (grey nurse shark). Schools of *Lutjanus argentimaculatus* (mangrove jack) were common at Windara Bank, whereas at Julian Rocks they were recorded in small numbers in caves.

Wilsons Reef supported dense stands of the kelp *Eklonia radiata*, which was colonized by several species of monacanthids and large schools ($n > 5\ 000$) of *Trachurus novaezelandiae* (yellowtail). These species were most abundant during the warmer months.

The fish assemblage at Lennox Head Moat was dominated by species that prefer shallow protected sites. Several species were significant New South Wales records. These included *Parupeneus indicus* (Indian goatfish), which is rare within the Capricorn-Bunker group of the GBR (Russell 1983). However, it has been recorded at Lizard Island where it inhabits silty sand or seagrass areas (Kuiter 1992). The cardinal goatfish, *Parupeneus ciliatus*, has been described as uncommon in the Capricorn-Bunker group of the GBR (Russell 1983) where it occurs in lagoons and outer reef slopes. However, this species is widespread

Table 2. Relative abundances of tropical, subtropical and temperate species (percentage values next to tropical, subtropical and temperate categories represent the proportion of these respective assemblages).

	Common	Occasional	Uncommon	Rare	Total
Tropical	25 (6.3%)	92 (23.3%)	213 (54.1%)	64 (16.2%)	394 (74.3%)
Subtropical	12 (38.7%)	9 (29.0%)	9 (29.0%)	1 (3.2%)	31 (5.8%)
Temperate	20 (19.4%)	30 (29.1%)	45 (43.7%)	8 (7.8%)	103 (19.4%)
Cir.-glob or cir.-Aust.		1 (50%)	1 (50%)		2 (0.4%)
Total and percentage of assemblage	57 (10.7%)	132 (24.9%)	268 (50.6%)	73 (13.8%)	530 (99.9%)

Table 3. Relative abundances of species in the six most speciose families (percentage values represent abundance in the respective family).

Family	Common	Occasional	Uncommon	Rare	Total
Labridae	11 (14.9%)	17 (22.9%)	39 (52.7%)	7 (9.5%)	74
Pomacentridae	6 (13.9%)	18 (41.8%)	14 (32.5%)	5 (11.6%)	43
Chaetodontidae	3 (11.5%)	9 (34.6%)	6 (23.0%)	8 (30.7%)	26
Serranidae	0	5 (20.8%)	13 (54.1%)	6 (25.0%)	24
Acanthuridae	4 (21.0%)	2 (10.5%)	10 (52.6%)	3 (15.7%)	19
Monacanthidae	0	8 (50.0%)	5 (31.2%)	3 (18.7%)	16
Total and percentage of assemblage	24 (4.5%)	59 (11.1%)	87 (16.4%)	32 (6.0%)	202 (38.1%)

Table 4. Fish species recorded at offshore, near-shore and estuary sites that were not recorded from Julian Rocks (see Appendix 1).

Location			
Windara Bank	Wilsons Reef	Lennox Head	Belongil Creek
SERRANIDAE	SERRANIDAE	MURAENIDAE	DASYATIDIDAE
<i>Pseudanthias fasciatus</i>	<i>Hypoplectrodes jamesoni</i>	<i>Echidna nebulosa</i>	<i>Dasyatis fluviatorum</i>
LABRIDAE	CHAETODONTIDAE	SERRANIDAE	ANGUILLIDAE
<i>Bodianus loxozonus</i>	<i>Coradion chrysozonus</i>	<i>Epinephelus cyanopodus</i>	<i>Anguilla reinhardtii</i>
	MONACANTHIDAE	MULLIDAE	POECILIIDAE (introduced)
	<i>Paramonacanthus otisensis</i>	<i>Parupeneus ciliatus</i>	<i>Gambusia holbrooki</i>
	<i>Acanthaluteres vittiger</i>	<i>Parupeneus indicus</i>	ATHERINIDAE
	TETRAODONTIDAE	POMACENTRIDAE	<i>Atherinomorus lacunosus</i>
	<i>Canthigaster amboinensis</i>	<i>Chrysiptera glauca</i>	SYNGNATHIDAE
	MOLIDAE	LABRIDAE	<i>Vanacampus margaritifera</i>
	<i>Mola ramsayi</i>	<i>Halichoeres trimaculatus</i>	AMBASSIDAE
		<i>Pseudocheilinus hexataenia</i>	<i>Ambassis marianus</i>
		BLENNIIDAE	TERAPONTIDAE
		<i>Omobranchius anolius</i>	<i>Pelates sexlineatus</i>
		SIGANIDAE	MUGILIDAE
		<i>Siganus spinus</i>	<i>Liza argentea</i>
		BALISTIDAE	<i>Mugil cephalus</i>
		<i>Rhinecanthus aculeatus</i>	<i>Myxus elongatus</i>
		TETRAODONTIDAE	BLENNIIDAE
		<i>Arothron manilensis</i>	<i>Xiphias setifer</i>
			ELEOTRIDIDAE
			<i>Philypnodon grandiceps</i>
			<i>Hypseleotris compressa</i>
			SOLEIDAE
			<i>Synaptura nigra</i>
			TETRAODONTIDAE
			<i>Tetractenos hamiltoni</i>

in the tropical Western-Pacific and has been recorded as far south as Sydney (Kuiter 1993). *Chrysiptera glauca* (grey damselfish) is uncommon on exposed reef flats in the Capricorn-Bunker Section of the GBR (Russell 1983). It was collected at Lennox Head among rocky boulders in shallow water of approximately 1 m depth. *Halichoeres trimaculatus* (three-spot wrasse) has not previously been recorded from coastal New South Wales. It is common in reef lagoons within the Capricorn-Bunker group of the GBR (Russell 1983) and has been recorded at Lord Howe Island (Francis 1993). *Pseudocheilinus hexataenia* (sixstripe wrasse) is moderately common in lagoons and on outer reef slopes within the Capricorn-Bunker group of the GBR and has been recorded at Lord Howe Island (Francis 1993). *Siganus spinus* (spiny rabbitfish) is uncommon in lagoons and outer reef slopes within the Capricorn-Bunker Section of the GBR (Russell 1983). *Arothron manilensis* (striped puffer) was recorded at Lennox Head and has been reported from the Western Pacific (Kuiter 1993) and east to Micronesia and Samoa (Randall *et al.* 1997). However, it was not recorded from the Capricorn-Bunker group of the GBR (Russell 1983; Lowe and Russell 1990) nor from Lord Howe Island (Allen *et al.* 1976).

Species at the extreme of their known adult range

A total of 114 (21.5%) tropical species in 31 families are new distribution records for coastal New South Wales or for the Australian eastern coast (e.g., *Discotrema crinophila*). Similarly, 12 (2.2%) temperate species in 10 families had not previously been recorded as far north as the study area (Appendix 1; Table 5).

Endemic species

A total of 96 species recorded are endemic to Australia (see Paxton *et al.* 1989; Randall *et al.* 1990; Kuiter 1993; Gomon *et al.* 1994; Last and Stevens 1994) (Appendix 1). Of these, 29 species are confined to the subtropics or near subtropics (Table 6). The most significant subtropical endemic species recorded were *Amphiprion latezonatus* (wide-striped clownfish) and *Cirrhitus splendens* (splendid hawkfish). *Amphiprion latezonatus* frequents offshore subtropical rocky reefs. It is the most common anemone fish recorded at Norfolk Island (Coleman 1991, pers. obs.), it is common at Lord Howe Island (Allen *et al.* 1976, pers. obs.) and relatively common at Julian Rocks and at the Solitary Islands group (pers. obs.). *Cirrhitus splendens* has been

Table 5. Adult fish species recorded at the extremes of their known mainland ranges (see Appendix 1). Distribution data follows Kuitert (pers. comm.), Coleman (1986a, 1986b), Hutchins and Swainston (1986), Allen and Swainston (1988), Paxton *et al.* (1989), Randall *et al.* (1990), Kuitert (1992), Kuitert (1993), Last and Stevens (1994), Gomon *et al.* (1994) and Hutchins (pers. comm.).

Family	Numbers of species		Family	Numbers of species	
	Tropical	Temperate		Tropical	Temperate
UROLOPHIDAE		1	SCATOPHAGIDAE	1	
CARCHARHINIDAE	2		CHAETODONTIDAE	8	
BRACHAELURIDAE	1		POMACANTHIDAE	4	
HEMISCYLLIIDAE	1		POMACENTRIDAE	19	
MURAENIDAE	4		CIRRHITIDAE	2	
OPHICHTHIDAE	3		CHIRONEMIDAE		1
HOLOCENTRIDAE	3		LABRIDAE	5	2
SCORPAENIDAE	4		ODACIDAE		2
SERRANIDAE	9	1	SCARIDAE	3	
LABRACOGLOSSIDAE		1	PINGUIPEDIDAE	1	1
CARANGIDAE	1		BLENNIIDAE	5	
LUTJANIDAE	4		GOBIESOCIDAE	1	
CAESIONIDAE	1		GOBIIDAE	4	1
HAEMULIDAE	1		ACANTHURIDAE	8	
LETHRINIDAE	1		SIGANIDAE	3	
MULLIDAE	4		BALISTIDAE	2	
PEMPHERIDIDAE		1	MONACANTHIDAE	2	1
EPHIPPIDAE	3		TETRAODONTIDAE	4	
Sub-totals	42	4		72	8

Totals: 114 (21.5%) tropical species; 12 (2.2%) temperate species.

Table 6. Fish species endemic to the mid-Eastern Transition Zone (subtropical) or which are antiequatorial in distribution. These species have their primary breeding populations between Yeppoon, Queensland (23°08'S) and Seal Rocks, New South Wales (32°28'S). Distribution data from Appendix 1, Wilson and Allen (1987), Paxton *et al.* (1989), Randall *et al.* (1990, 1997), Kuitert (1992, 1993), Last and Stevens (1994), Gomon *et al.* (1994).

Family	Species
BRACHAELURIDAE	<i>Brachaelurus waddi</i>
CLUPEIDAE	<i>Herklotsichthys castelnaui</i>
BATRACHOIDIDAE	<i>Batrachomoeus dubius</i>
SYNGNATHIDAE	<i>Hippocampus whitei</i>
PEMPHERIDIDAE	<i>Pempheris affinis</i>
CHAETODONTIDAE	<i>Amphichaetodon howensis</i> , <i>Chaetodon guentheri</i> (antiequatorial)
POMACANTHIDAE	<i>Chaetodontoplus conspicilatus</i>
POMACENTRIDAE	<i>Amphiprion latezonatus</i> , <i>Chromis flavomaculata</i> (antiequatorial), <i>Parma oligolepis</i> , <i>Parma polylepis</i> , <i>Parma unifasciata</i>
CIRRHITIDAE	<i>Cirrhitus splendens</i>
CHEILODACTYLIDAE	<i>Cheilodactylus vestitus</i>
LABRIDAE	<i>Anampses femininus</i> , <i>Coris aurilineata</i> , <i>Coris picta</i> , <i>Macropharyngodon choati</i> , <i>Notolabrus gymnogenis</i> , <i>Pseudolabrus guentheri</i>
PINGUIPEDIDAE	<i>Parapercis stricticeps</i>
TRIPTERYGIIDAE	<i>Enneapterygius rufopileus</i>
ACANTHURIDAE	<i>Prionurus maculatus</i> , <i>Prionurus microlepidotus</i>
SOLEIDAE	<i>Synaptura nigra</i>
MONACANTHIDAE	<i>Cantheschenia grandisquamis</i>
TETRAODONTIDAE	<i>Canthigaster callisterna</i>
DIODONTIDAE	<i>Chilomycterus reticulatus</i>

recorded at Lord Howe Island (Allen *et al.* 1976), at the Solitary Islands (Coleman 1986a) and at Julian Rocks (Appendix 1).

Breeding records

Records of the adhesive egg masses of pomacentrids provided conclusive evidence that predominantly tropical species also breed within subtropical waters. The species, *Abudefduf bengalensis*, *A. vaigiensis* and *A. whitei*, were three common tropical pomacentrids recorded breeding at Julian Rocks.

Egg masses were noted during the summers and early autumns of 1990–1995 when water temperatures were generally above 22°C. A long breeding period, from October to July, was recorded for the subtropical anemone fish *Amphiprion latezonatus*.

DISCUSSION

Over 700 fish species could occur in the marine waters off northern New South Wales. Records to the north of the study sites included over 50 additional species of

gobiids, over 15 blenniids (Russell 1983; Lowe and Russell 1990) and over 80 estuarine species (Blaber and Blaber 1980; Morton 1989, 1990; McDowall 1996; Rowlands, undated).

Records of species to the south of the study sites (e.g., Hutchins and Swainston 1986; Paxton *et al.* 1989; Kuiter 1993; Gomon *et al.* 1994) and of tropical fishes recorded in Sydney Harbour (Kuiter, pers. comm.) suggest that many of these could occur in northern New South Wales waters. It is also likely that additional offshore and deep sea species will be added to the checklist, since relatively few surveys of these fishes have been reported.

Northern tropical zone

Over 1 200 species of fish from the Capricorn-Bunker reefs, the Western-Pacific, the Eastern Indian Ocean and the islands of Oceania were listed by Randall *et al.* (1997). Numerous additional records are documented in Paxton *et al.* (1989) and in other pictorial guides (e.g., Kuiter 1992, 1993; Last and Stevens 1994).

In relation to fish surveys undertaken to the north of the study sites, 920 species have been recorded for the Capricorn-Bunker Group of the GBR (Russell 1983; Lowe and Russell 1990). Russell (1983) separated these species into Indo-West Pacific (46.3%) and tropical Western Pacific (19.7%) components. The remaining species included a distinctive subtropical-temperate component.

South of the Capricorn-Bunker group of the GBR Marine Park lie numerous rocky reefs, some of which contain a high density of coral cover. Wright (1990) commented that 175 fish species had been recorded at Flinders Reef, a popular coral reef dive site located 5 km north-west of Cape Moreton. However, it is likely that Flinders Reef would support significantly more than 175 species based on the records for northern New South Wales and the high positive correlation between fish and hermatypic corals (Francis 1993).

Subtropical zones

The fishes of northern New South Wales, in contrast to the GBR and southern Queensland, have been either poorly surveyed or, in the case of museum studies, the data is unpublished.

The most significant fish surveys to date were those of Lord Howe Island and of Elizabeth and Middleton Reefs. The Lord Howe Island survey collected 208 new species, increasing the fish fauna of the area to 447 species in 107 families (Allen *et al.* 1976). The majority of these species (60%) were

wide-ranging tropical forms, 10% were found only within the South-West Pacific and less than 4% were restricted to Lord Howe and/or Norfolk Islands. An additional 35 species were later added to this total taking the known coastal fish fauna of Lord Howe Island to 433 species after taxonomic revision (Francis 1993; Francis and Randall 1993).

The Elizabeth and Middleton Reefs (29°56'E, 159°03'S and 29°27'E, 159°06'S) survey in 1987 recorded 224 species which, when combined with existing Museum records, took the total number recorded for these reefs to 314 species in 174 genera and 75 families (Gill and Reader 1992). This total was considered low when compared to the known fishes of Lord Howe Island or the Capricorn-Bunker group of the southern GBR but was high when compared to the 254 species recorded at Norfolk Island (Francis and Randall 1993) and the 145 species at the Kermadec Islands (Francis 1993). Several additional species have since been added to this total (Randall, pers. comm.) and it is likely that the number of species will increase following surveys in largely unsampled habitats such as reef slopes and drop-offs below 20 m.

The Solitary Islands group, located approximately 180 km south of Julian Rocks has been sampled by Clements (1991), Hutchins (pers. comm.), the Australian Museum (J. Paxton, pers. comm.), Sydney University (M. Kingsford, pers. comm.), New England University (S. Smith, pers. comm.) and New South Wales Fisheries (D. Pollard, pers. comm.). The more comprehensive of these surveys listed less than 300 species. However, personal observations from North Solitary Island, North-West Rock, Split Solitary Island and South Solitary Island suggest that this area would support a more diverse fish assemblage than that occurring at Julian Rocks. This is attributed to its larger area, including the number and distribution of offshore rocky reefs, and the greater abundance of corals within the Solitary Islands region (Veron 1986; Harriott *et al.* 1994; pers. obs.). These habitats provide for greater biodiversity than those occurring at Julian Rocks and are likely to provide more locations where marine fish larvae may settle (see Francis 1993).

Recruitment

Virtually all of the tropical species recorded at the survey sites were adults. For example, in the major families all of the 26 species of chaetodontids, the 43 species of pomacentrids and 70 of the 74 species of labrids were observed as adult forms.

It has been well reported that the East Coast Current transports marine larvae southwards in the plankton (e.g., Leis 1991) and that spawning modes influence the distance that larvae may travel (Thresher 1991). The data presented is consistent with the southerly planktonic transport of marine fish larvae and larval input from tropical regions to the north of the study sites.

Pomacentrids are more easily detected breeding than other fish species as they spawn in pairs on the substrate (Erlich 1975) and lay adhesive eggs that are visible on rock surfaces (see Appendix 1). Pomacentrid larvae, except for the anemonefishes (Thresher *et al.* 1989), spend about two to three weeks in the plankton before settling (Brothers *et al.* 1983). Therefore, it is likely that habitats at Julian Rocks provide geographic "stepping stones" allowing tropical pomacentrids to extend their range into subtropical and temperate waters.

For other fish families, no direct evidence of breeding was obtained. However, juvenile tropical labrids have been recorded at higher latitudes (e.g., Sydney Harbour and Montague Island) during late summer and autumn (Bruce 1978; Hutchins and Swainston 1986; Kuiter 1993 and pers. obs.). It is likely that adult labrids could spawn within northern New South Wales waters as their larvae can spend between 25 to 30 days in the plankton (Brothers *et al.* 1983).

Conclusion

This study provides the first annotated fish checklist for Julian Rocks and northern New South Wales marine waters. It also provides distributional and abundance data for species of tropical, subtropical and temperate origin, lists 114 tropical species not previously known for New South Wales and identifies 29 species endemic to the mid-Eastern Transition Zone or which are anti-equatorial in distribution.

Many of the species recorded were uncommon or, in some cases, recorded only once during the study. In some cases adult tropical species would migrate into the study area as adult forms and remain for one or two summers. These species included *Epinephelus tukula* (potato cod), *Plectropomus laevis* (Chinese footballer), *Acanthurus nigricans* (white-cheeked tang), *Zebrasoma scopas* (brown sailfin tang) and *Zebrasoma veliferum* (sailfin tang). Other tropical species, however, migrate southwards through the study area each summer and return to tropical waters by autumn or early winter. These species included *Stegostoma fasciatum* (leopard shark), *Scomberomorus commerson* (narrow-barred Spanish mackerel)

and *Scomberomorus munroi* (Australian spotted mackerel).

The value of the Julian Rocks Aquatic Reserve as a refugia from most aspects of human impact is apparent from the results of this study. However, it is timely to review the boundaries and management of the Aquatic Reserve in light of the marine conservation initiatives that have occurred in the 17 years since the Reserve was gazetted.

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Julian Rocks located approximately 5 km off Cape Byron, New South Wales.



The author recording data on an underwater slate. Photo Liz Rankin.

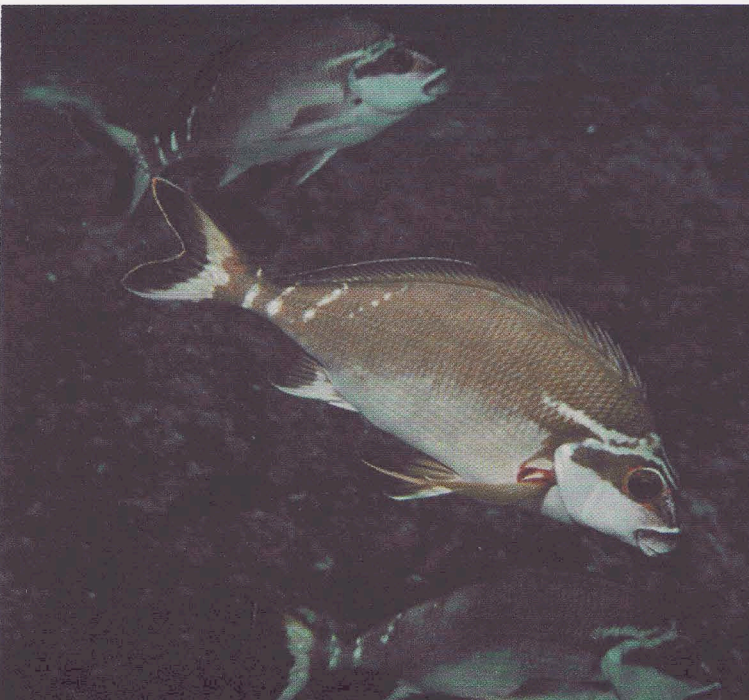


△ A male crimson-banded wrasse, *Notolabrus gymnogenis* (Günther, 1862); a common subtropical species at Julian Rocks.



△ Harlequin ghost pipefish, *Solenostomus paradoxus* (Pallas, 1870); an uncommon, though cryptic, tropical species recorded at Julian Rocks.

Red morwong, *Cheilodactylus fuscus* Castelnau, 1879; a common
▽ temperate species recorded within the study area.



Blackspot goatfish, *Parupeneus spilurus* (Bleeker, 1854); a common
▽ temperate species recorded at Julian Rocks.



APPENDIX 1

Annotated checklist of marine fish species recorded from northern New South Wales

KEY TO SYMBOLS

Locality

JR = Julian Rocks

LH = Lennox Head Moat

Wi = Wilsons Reef

W = Windarra Bank

Abundance category

c = common: frequently recorded at most habitats

o = occasional: recorded at some habitats although uncommon at others

u = uncommon: recorded irregularly or sometimes common at a specific habitat

r = rare: recorded once or if more than once, considered the same individual

Maturity

j = juvenile

sa = sub-adult

a = adult

b = breeding (eggs recorded)

QM = identified by and lodged with the Queensland Museum, Brisbane

AM = identified by and lodged with the Australian Museum, Sydney

"*" = recorded from the extremes of the known adult mainland range

Additional notes

Tropical species marked with an "*" are the first New South Wales record

The primary distribution of each species is listed first in the distribution column

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
DASYATIDIDAE							
<i>Dasyatis brevicaudata</i>	(Hutton, 1875)	smooth stingray	JR	Temp.SOCIRCUM (exp. Sth Am.)	a	5–15 m	r
<i>Dasyatis fluviorum</i>	Ogilby, 1908	estuary stingaree	BC	Trop./subtrop.WSWP	a	<1 m	u
<i>Dasyatis kuhlii</i>	(Müller & Henle, 1841)	blue-spotted stingray	JR;Wi	Trop.IWP	a	5–15 m	o
<i>Dasyatis thetidis</i>	Ogilby, 1899	black stringray	JR;W	Temp.SOCIRCUM (except Sth Am.)	a	5–40 m	u
<i>Himantura uarnak</i>	(Forsskål, 1775)	long-tailed stingray	JR;Wi;W	Trop.IWCP	a	5–40 m	u
<i>Pastinachus sephen</i>	(Forsskål, 1775)	cowtail ray	JR;Wi	Trop.IWP	a	5–24 m	u
<i>Taeniura meyeni</i>	(Müller & Henle, 1841)	black-spotted stingray	JR;Wi;W	Trop.IWP	a	5–40 m	o
UROLOPHIDAE							
<i>Trygonoptera testacea</i>	(Müller & Henle, 1841)	common stingaree	JR;Wi	Trop./Temp.SWP (endemic)	a	5–24 m	o
<i>Urolophus</i> sp. <i>A</i>		Kapala stingaree	JR	*Temp.SWP(endemic)	a	24 m	r
MYLIOBATIDIDAE							
<i>Aetobatus narinari</i>	(Euphrasen, 1790)	spotted eagle ray	JR;Wi;W	Trop.CIRCUM	a	5–40 m	u
<i>Myliobatus australis</i>	Macleay, 1881	eagle ray	JR;W	Trop./Temp. IWP (endemic)	a	2–40 m	u
RHINOPTERIDAE							
<i>Rhinoptera neglecta</i>	Ogilby, 1912	Australian cownose ray	JR	Trop./Temp. IWP (endemic)	a	2–20 m	o
MOBULIDAE							
<i>Manta birostris</i>	(Donndorf, 1798)	manta ray	JR	Trop./Temp. IWP (endemic)	a	2–5 m	u
RHYNCHOBATIDAE							
<i>Rhina ancylostoma</i>	Bloch & Schneider, 1801	shark ray	JR;W	Trop.IWP	a	40 m	r
<i>Rhynchobatus djiddensis</i>	(Forsskål, 1775)	white-spotted shovelnose ray	JR	Trop.IWP	a	5–24 m	u
RHINOBATIDAE							
<i>Trygonorrhina fasciata</i>	Müller & Henle, 1841	fiddler ray	JR	Temp.WSWP(endemic)	a	10–24 m	u
HYPNIDAE							
<i>Hypnos monoptyerygium</i>	(Shaw & Nodder, 1795)	numbfish	JR;Wi	Temp. SWP(endemic)	a	5–24 m	u
ODONTASPIDIDAE							
<i>Carcharias taurus</i>	Rafinesque, 1810	grey nurse shark	JR;W	Temp./Trop. Atlantic,IWP	a	5–40 m	u
LAMNIDAE							
<i>Carcharodon carcharias</i>	(Linnaeus, 1758)	white pointer	JR, fisher	Temp./Trop.CIRCUM (antitropical)	a(5 m)	oceanic & pelagic	u
<i>Isurus oxyrinchus</i>	Rafinesque, 1810	shortfin mako	fisher ("7 Mile Reef")	Trop./Temp. sth.CIRCUM	a	oceanic & pelagic	o
CARCHARHINIDAE							
<i>Carcharhinus brachyurus</i>	(Günther, 1870)	bronze whaler	JR;Wi	Temp./Trop.CIRCUM (exp. western Atlantic)		10–24 m	u
<i>Carcharhinus plumbeus</i>	(Nardo, 1827)	sandbar shark	JR;W	*Trop.IWCP & Atlantic	a	40 m	u
<i>Galeocerdo cuvier</i>	(Péron & Lesueur, 1822)	tiger shark	JR, fisher	Trop.CIRCUM	a		u
<i>Negaprion acutidens</i>	(Rüppell, 1837)	lemon shark	Middle Reef	*Trop.IWCP	a	8 m	u
SPHYRNIDAE							
<i>Sphyrna mokarran</i>	(Rüppell, 1837)	great hammer-head	JR	Trop./Temp.IWCP	a	oceanic & pelagic	u
RHINCODONTIDAE							
<i>Rhincodon typus</i>	(Smith, 1828)	whale shark	JR	Trop.CIRCUM	a	pelagic	r
BRACHAELURIDAE							
<i>Brachaelurus colcloughi</i>	Ogilby, 1908	Colcloughs shark	JR	*Trop.WSWP(endemic)	a	10–22 m	o
<i>Brachaelurus waddi</i>	(Bloch & Schneider, 1801)	blind shark	JR	Subtrop. SWP (endemic)	a	3–15 m	o
ORECTOLOBIDAE							
<i>Orectolobus maculatus</i>	(Bonnaterre, 1788)	spotted wobbegong	JR;W	CIRCUM(Aust.) (poss. endemic)	a	3–24 m	o
<i>Orectolobus ornatus</i>	(De Vis, 1883)	banded wobbegong	JR;LH;Wi;W	Trop./Temp.WP	a	3–40 m	c

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
STEGOSTOMATIDAE							
<i>Stegostoma fasciatum</i>	(Hermann, 1783)	leopard shark	JR	Trop. IWP	a	3–18 m	u
HEMISCYLLIIDAE							
<i>Chiloscyllium punctatum</i>	Müller & Henle, 1838	grey carpet shark	JR	*Trop. IWP	a	12–22 m	u
OPHICHTHIDAE							
<i>Leiuranus semicinctus</i>	(Lay & Bennett, 1839)	culverin	JR	*Trop. IWCP	a	15 m	u
<i>Myrichthys maculatus</i>	(Cuvier, 1817)	spotted snake eel	JR	*Trop. IWCP	a	18 m	u
<i>Myrichthys colubrinus</i>	(Boddaert, 1781)	harlequin snake eel	JR(AM)	*Trop. IWCP	a	20 m	r
ANGUILLIDAE							
<i>Anguilla reinhardtii</i>	Steindachner, 1867	long-finned eel	BC	Trop./Temp. SWP	a	<2 m	o
MURAENIDAE							
<i>Echidna nebulosa</i>	(Thunberg, 1789)	starry moray	LH	*Trop. IWP	a	2 m	u
<i>Enchelycore ramosa</i>	(Griffin, 1926)	mosaic moray	JR	Temp. CP	a	15 m	u
<i>Gymnothorax chilospilus</i>	Bleeker, 1865	lipspot moray	JR(AM)	*Trop. IWCP	a	6–12 m	u
<i>Gymnothorax eurastus</i>	(Abbott, 1860)	spotted moray	JR	Trop. IWP	a	6–24 m	o
<i>Gymnothorax favagineus</i>	(Bloch & Schneider, 1801)	blackspotted moray	JR; LH	Trop. IWP	a	6–24 m	r
<i>Gymnothorax meleagris</i>	(Shaw & Nodder, 1795)	whitemouth moray	JR	*Trop. IWP	a	6–24 m	r
<i>Gymnothorax prasinus</i>	(Richardson, 1848)	green moray	JR; LH; Wi; W	Temp. ISWP	a	2–40 m	c
<i>Gymnothorax undulatus</i>	(Lacepède, 1803)	mottled moray	JR; LH	Trop. IWCP	a	6–24 m	u
<i>Sideria thyroidea</i>	(Richardson, 1845)	freckled moray	JR	*Trop. IWP	a	1–24 m	o
CLUPEIDAE							
<i>Hyperlophus vittatus</i>	(Castelnau, 1875)	sandy sprat	beach fisher (Clarks Beach)(QM)	Temp. ISWP(endemic)	a	pelagic, estuarine	c
<i>Herklotichthys castelnaui</i>	(Ogilby, 1897)	southern herring	BC	Subtrop./Temp. SWP (endemic)	a	estuarine	o
ENGRAULIDAE							
<i>Engraulis australis</i>	(White, 1790)	Australian anchovy	beach fisher (Clarks Beach)(QM)	Temp. ISWP	a	pelagic, estuarine	c
PLOTOSIDAE							
<i>Cnidogobius macrocephalus</i>	(Valenciennes, 1840)	estuary catfish	JR; Wi	Temp. ISWP(endemic)	a	10–24 m	u
<i>Plotosus lineatus</i>	(Thunberg, 1787)	catfish eel	JR	Trop. IWP	a	15–24 m	u
AULOPIDAE							
<i>Aulopus purpurissatus</i>	Richardson, 1843	sergeant baker	JR; W	Temp. ISWP(endemic)	a	6–40 m	o
SYNODONTIDAE							
<i>Synodus variegatus</i>	(Lacepède, 1803)	variegated lizardfish	JR; LH	Trop. IWP	a	1–24 m	o
BATRACHOIDIDAE							
<i>Batrachomoeus dubius</i>	(White, 1790)	eastern frogfish	JR(AM)	Subtrop./Temp. SWP (endemic)	a	5–15 m	u
ANTENNARIIDAE							
<i>Antennarius nummifer</i>	(Cuvier, 1817)	white-finger anglerfish	JR	Trop. IWP	j (1.5 cm)	9–18 m	u
<i>Antennarius striatus</i>	(Shaw & Nodder, 1794)	striped anglerfish	JR	Trop. IWP	a	15 m	r
<i>Histrio histrio</i>	(Linnaeus, 1758)	sargassum anglerfish	BC	Trop. IWP & Atlantic	a	1.5 m	u
MORIDAE							
<i>Lotella rhacinus</i>	(Forster, 1801)	beardie	JR	Temp. SWP	a	10–24 m	u
HEMIRAMPHIDAE							
<i>Hyporhamphus australis</i>	Valenciennes, 1847	sea garfish	JR; LH	Temp. SWP(endemic)	a	pelagic	u
BELONIDAE							
<i>Ablennes hians</i>	(Valenciennes, 1846)	barred longtom	JR	Trop. CIRCUM	a	pelagic	o
POECILIIDAE							
<i>Gambusia holbrooki</i>	(Baird & Girard, 1853)	mosquito fish	BC	Trop./Temp. introduced	a	pelagic	c
ATHERINIDAE							
<i>Atherinomorus lacunosus</i>	(Forster, 1801)	robust hardyhead	BC	Trop. IWP	a	1 m	c
MONOCENTRIDAE							
<i>Cleidopus gloriarius</i>	De Vis, 1882	knight fish	JR	Trop./Temp. ISWP	a	10–24 m	u

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
TRACHICHTHYIDAE							
<i>Optivus</i> sp. nov.	Gomon ms.	slender roughy	JR	Temp.SWP	a	10–24 m	u
<i>Trachichthys australis</i>	Shaw, 1799	roughy	JR;Wi	Temp.ISWP	a	5–15 m	u
REGALECIDAE							
<i>Regalecus glesne</i>	Ascanius, 1772	oar fish	beach fisher (Clarks Beach)(QM)	Temp./Trop.CIRCUM	a	pelagic	r
AULOSTOMIDAE							
<i>Aulostomus chinensis</i>	(Linnaeus, 1766)	trumpet fish	JR;Wi;W	Trop.IWCP	a	pelagic to 24 m	o
FISTULARIIDAE							
<i>Fistularia commersonii</i>	Rüppell, 1838	smooth flutemouth	JR;LH;Wi	Trop.IWCP	a	pelagic to 40 m	o
<i>Fistularia pelimba</i>	Lacepède, 1803	flutemouth	boat fisher(AM) ("Four-mile Reef)	Trop./Temp.IWCP & Atlantic	a	120 m	u
HOLOCENTRIDAE							
<i>Myripristis murdjan</i>	(Forsskål, 1775)	crimson squirrelfish	JR	Trop.IWCP	a	10–24 m	u
<i>Sargocentron caudimaculatum</i>	(Rüppell, 1838)	tail-spot squirrelfish	JR	*Trop.IWP	a	10–24 m	u
<i>Sargocentron diadema</i>	(Lacepède, 1802)	crown squirrelfish	JR	*Trop.IWP	a	10–24 m	u
<i>Sargocentron rubrum</i>	(Forsskål, 1755)	redcoat	JR;W	*Trop.IWCP	a	10–40 m	u
SOLENOSTOMIDAE							
<i>Solenostomus paradoxus</i>	(Pallas, 1770)	harlequin ghost pipefish	JR	Trop.IWP	a	18 m	u (on crinoid)
SYNGNATHIDAE							
<i>Hippocampus whitei</i>	Bleeker, 1855	White's seahorse	JR	Temp.ISWP(endemic)	a	24 m	r
<i>Maroubra perserrata</i>	Whitley, 1948	saw-tooth pipefish	JR	Temp.SWP(endemic)	a	5–24 m	o
<i>Vanacampus margaritifer</i>	Peters, 1869	mother-of-pearl pipefish	BC	Trop./Temp.ISWP (endemic)	a	1 m	u
SCORPAENIDAE							
<i>Centropogon australis</i>	(White, 1790)	eastern fortescue	LH;Wi;BC	Temp./Subtrop.SWP (endemic)	a	2–15 m	o
<i>Dendrochirus brachypterus</i>	(Cuvier, 1829)	dwarf lionfish	JR	Trop.IWCP	a	3–24 m	u
<i>Dendrochirus zebra</i>	(Cuvier, 1829)	zebra lionfish	JR;LH	Trop.CIRCUM	a	3–24 m	u
<i>Pterois antennata</i>	(Bloch, 1787)	ragged-finned firefish	JR	Trop.IWCP	a	3–24 m	u
<i>Pterois volitans</i>	(Linnaeus, 1758)	red firefish	JR;W	Trop.IWCP	a	3–40 m	o
<i>Rhinopias aphanes</i>	Eschmeyer, 1973	Merlet's scorpionfish	JR	*Trop.WP	a	24 m	r
<i>Richardsonichthys leucogaster</i>	(Richardson, 1848)	white-face waspfish	JR	*Trop.IWP	a	3–24 m	r
<i>Scorpaena cardinalis</i>	Richardson, 1842	eastern red scorpion cod	JR;Wi;W	Temp./Subtrop.SWP (endemic)	a	3–40 m	o
<i>Scorpaenodes litoralis</i>	(Tanaka, 1917)	little scorpionfish	JR;LH(QM)	Trop.IWCP	u	1–24 m	u
<i>Scorpaenodes scaber</i>	(Ramsay & Ogilby, 1886)	pigmy scorpioncod	JR;LH	Temp.SWP(endemic)	a	1–24 m	u
<i>Scorpaenopsis diabolus</i>	Cuvier, 1829	false stonefish	JR	Trop.IWP	a	3–24 m	u
<i>Sebastapistes cyanostigma</i>	(Bleeker, 1856)	yellow-spotted scorpionfish	JR	*Trop.IWCP	a	3–24 m	r
<i>Synanceia horrida</i>	(Linnaeus, 1766)	estuarine stonefish	JR	*Trop.IWP	a	3–24 m	r
<i>Taenianotus triacanthus</i>	Lacepède, 1802	leaf scorpionfish	JR	Trop.IWCP	a	3–24 m	u
PATAECIDAE							
<i>Palaeus fronto</i>	Richardson, 1844	red indian fish	JR	Temp.ISWP(endemic)	j (5 cm)	18–24 m	u
CARACANTHIDAE							
<i>Caracanthus maculatus</i>	(Gray, 1831)	spotted croucher	JR	Trop.IWP	a	9–15 m	u
PLATYCEPHALIDAE							
<i>Platycephalus fuscus</i>	Cuvier, 1829	dusky flathead	JR;LH;Wi;BC	Trop./Temp.IWP (endemic)	a	2–24 m	o
AMBASSIDAE							
<i>Ambassis marianus</i>	Günther, 1880	Ramsay's glassfish	BC	Temp.SWP(endemic)	a	1–2 m	c

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SERRANIDAE							
SUBFAMILY ANTHIINAE							
<i>Caprodon schlegelii</i>	(Günther, 1859)		fisher(AM)	Trop./Temp.WSWP	a	120 m (angled)	u
<i>Hypoplectrodes annulatus</i>	Günther, 1859	yellow-banded seaperch	JR;LH	Temp./Subtrop.SWP (endemic)	a	5-24 m	u
<i>Hypoplectrodes jamesoni</i>	Ogilby, 1908	Jameson's seaperch	Wi	Temp.SWP(endemic)	a	13 m	r
<i>Hypoplectrodes maccullochi</i>	Whitley, 1929	half-banded seaperch	JR;LH;Wi;W	Temp./Subtrop.SWP (endemic)	a	5-40 m	o
<i>Pseudanthias cooperi</i>	(Regan, 1902)	silver-streak anthias	JR	*Trop.IWCP	a	5-24 m	u
<i>Pseudanthias fasciatus</i>	(Kamohara, 1954)	striped anthias	W	*Trop.IWCP	a	30-40 m	r
<i>Pseudanthias hypselosoma</i>	Bleeker, 1878	stocky anthias	JR	*Trop.WP	a	10-24 m	u
<i>Pseudanthias squamipinnis</i>	(Peters, 1855)	scale-fin anthias	JR;W	Trop.IWP	a	3-40 m	o
SUBFAMILY EPINEPHELINAE							
<i>Acanthistius ocellatus</i>	Günther, 1859	eastern wirrah	JR;Wi;W	Temp./Subtrop.SWP (endemic)	a	10-40 m	u
<i>Cephalopholis miniata</i>	Forsskål, 1775	coral rock cod	JR	*Trop.IWP	a	10-24 m	u
<i>Epinephelus coioides</i>	(Hamilton, 1822)	estuary rockcod	JR	Trop.IWP	a	10-24 m	u
<i>Epinephelus cyanopodus</i>	(Richardson, 1846)	blue maori	LH	*Trop.IWP	a	2 m	r
<i>Epinephelus daemeli</i>	(Günther, 1876)	black cod	JR;W	Temp.SWP	a	5-40 m	o
<i>Epinephelus fasciatus</i>	(Forsskål, 1775)	black-tipped cod	JR	Trop.IWP	a	10-24 m	o
<i>Epinephelus lanceolatus</i>	(Bloch, 1790)	Queensland grouper	JR	Trop.IWP	a	18-24 m	u
<i>Epinephelus merra</i>	(Bloch, 1793)	honeycomb cod	JR	Trop.IWP	a	5-24 m	u
<i>Epinephelus quoyanus</i>	(Valenciennes, 1830)	longfin rockcod	JR	Trop.IWP	a	10-24 m	u
<i>Epinephelus tukula</i>	Morgans, 1959	potato cod	JR	*Trop.IWP	a	10-24 m	r
<i>Epinephelus undulostriatus</i>	Peters, 1867	maori cod	JR;Wi	Temp.SWP(endemic)	a	10-24 m	o
<i>Plectropomus laevis</i>	(Lacepède, 1802)	Chinese footballer	JR	*Trop.IWP	a	10-24 m	r
<i>Trachypoma macracanthus</i>	Günther, 1859	pacific rock cod	JR	*Temp.CP	a	10-24 m	u
SUBFAMILY GRAMMISTINAE							
<i>Diplaprion bifasciatus</i>	Kuhl & van Hasselt, 1828	yellow emperor	JR	Trop.IWP	a	10-24 m	u
<i>Grammistes sexlineatus</i>	(Thunberg, 1792)	six-lined perch	JR	*Trop.IWP	a	10-24 m	u
<i>Rainfordia opercularis</i>	McCulloch, 1923	flathead perch	JR	*Trop.IWP(endemic)	a	10 m	r
Plesiopidae							
<i>Paraplesiops bleekeri</i>	(Günther, 1861)	eastern blue devil	JR	Temp./Subtrop.SWP (endemic)	a	18-30 m	u
<i>Trachinops taeniatulus</i>	Günther, 1861	eastern hula fish	JR;Wi	Temp./Subtrop.SWP (endemic)	a	2-24 m	o
GLAUCOSOMATIDAE							
<i>Glaucosoma scapulare</i>	Ramsay, 1881	pearl perch	JR	Trop.IWP(endemic)	a	to 24 m	u
TERAPONTIDAE							
<i>Pelates quadrilineatus</i>	Bloch, 1790	trumpeter	JR	Trop.IWP	a	5-18 m	u
<i>Pelates sexlineatus</i>	(Quoy & Gaimard, 1825)	eastern striped trumpeter	BC	Temp.SWP(endemic)	a	<2 m	o
<i>Terapon jarbua</i>	(Forsskål, 1775)	crescent grunter	LH;BC	Trop.IWP	a	<2 m	u
KUHLIIDAE							
<i>Kuhlia mugil</i>	(Schneider, 1801)	five-bar flagtail	JR;LH	Trop.IWCP	a	pelagic	u
PRIACANTHIDAE							
<i>Heteropriacanthus cruentatus</i>	(Lacepède, 1801)	duskyfin bigeye	JR	Trop.CIRCUM	a	5-24 m	u
<i>Priacanthus hamrui</i>	(Forsskål, 1775)	lunar-tailed bigeye	JR	Trop.IWP	a	10-24 m	u
APOGONIDAE							
<i>Apogon aureus</i>	(Lacepède, 1802)	ring-tailed cardinalfish	JR	Trop.IWP	a	10-24 m	u
<i>Apogon crassiceps</i>	Rüppell, 1838	little ruby red cardinalfish	JR	Trop.IWP	a	10-24 m	u
<i>Apogon doederleini</i>	Jordan & Snyder, 1910	Doederlein's cardinal fish	JR;LH;Wi	Trop.IWP	a	2-24 m	c
<i>Apogon fasciatus</i>	(Shaw, 1790)	broad-banded cardinalfish	Middle Reef	Trop/Temp.IWP	a	6 m	u
<i>Apogon fraenatus</i>	Valenciennes, 1832	spiny-eyed cardinalfish	JR	Trop.IWP	a	10-24 m	u
<i>Apogon hallopterus</i>	Bleeker, 1856	iridescent cardinalfish	JR	Trop.IWP	a	10-24 m	u
<i>Apogon properius</i>	(Whitley, 1964)	orange-lined cardinalfish	JR;LH	Trop.WP(endemic)	a	1-24 m	u
<i>Apogon semiornatus</i>	Peters, 1876	oblique-banded cardinalfish	JR	Trop.IWP	a	3-18 m	u

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SILLAGINIDAE							
<i>Sillago ciliata</i>	Cuvier, 1829	sand whiting	LH;BC	Trop/Temp.SWP	a	2 m	c
MALACANTHIDAE							
<i>Malacanthus brevirostris</i>	Guichenot, 1848	flag-tail blunquillo	JR	Trop/Temp.IWCP	a	9-15 m	u
<i>Malacanthus latovittatus</i>	(Lacepède, 1801)	blue blunquillo	JR	Trop.IWCP	a	9-15 m	u
LABRACOGLOSSIDAE							
<i>Bathystethus cultratus</i>	Forster, 1810	knife fish	JR;(AM)	*Temp.SWP	a	pelagic	u
POMATOMIDAE							
<i>Pomatomus saltatrix</i>	(Linnaeus, 1766)	tailor	JR;LH;Wi;W	Trop/Temp.IWP & Atlantic	a	pelagic	o
ECHENEIDIDAE							
<i>Echeneis naucrates</i>	Linnaeus, 1758	slender suckerfish	JR;W	Trop.CIRCUM	a	10-40 m	u
<i>Remora remora</i>	(Linnaeus, 1758)	remora	JR	Trop/Temp.ISWP(Aust.)	a	10-24 m	u
CARANGIDAE							
<i>Carangoides fulvoguttatus</i>	(Forsskål, 1775)	gold-spotted trevally	JR	*Trop.IWP	sa	5-15 m	u
<i>Carangoides orthogrammus</i>	Jordan & Gilbert, 1882	thick-lip trevally	JR	Trop.IWCP	a	2-24 m	o
<i>Carangoides ferdau</i>	(Forsskål, 1775)	banded trevally	JR	Trop.IWP	a	2-24 m	o
<i>Caranx melampygus</i>	Cuvier, 1833	bluefin trevally	JR	Trop.IWP	a	2-24 m	u
<i>Caranx sexfasciatus</i>	Quoy & Gaimard, 1825	big-eye trevally	JR;W	Trop.IWCP	a	2-40 m	o
<i>Elagatis bipinnulatus</i>	(Quoy & Gaimard, 1825)	rainbow runner	JR;W	Trop.CIRCUM	a	pelagic	u
<i>Gnathanodon speciosus</i>	(Forsskål, 1775)	golden trevally	JR;BC	Trop.IP	sa (30cm)	3-10 m	u
<i>Naucrates ductor</i>	(Linnaeus, 1758)	pilot fish	JR	Temp/Trop.CIRCUM	j (5 cm)	pelagic	r
<i>Pseudocaranx dentex</i>	(Bloch & Schneider, 1801)	silver trevally	JR;LH;Wi	Temp.SWP(endemic)	a	1-24 m	c
<i>Scomberoides commersonnianus</i>	Lacepède, 1801	queen fish	JR	Trop.IWP	a	pelagic	u
<i>Seriola dumerili</i>	(Risso, 1810)	amberjack	JR;W	Temp.IWCP(antitrop.)	a	1-30 m	u
<i>Seriola lalandi</i>	Valenciennes, 1833	yellowtail kingfish	JR;Wi;W	Temp./Subtrop. CIRCUM	a	1-40 m	o
<i>Seriola nigrofasciata</i>	(Rüppell, 1829)	black-banded kingfish	JR	Trop.IWP	a	pelagic	r
<i>Trachinotus bailloni</i>	(Lacepède, 1801)	black-spotted dart	JR	Trop.IWP	a	pelagic	u
<i>Trachinotus coppingeri</i>	Günther, 1884	swallowtail dart	JR	Trop.SWP	a	pelagic	u
<i>Trachurus novaezelandiae</i>	Richardson, 1843	yellowtail	JR;LH;Wi;W	Temp.ISWP	a	pelagic to 40 m	c
CORYPHAENIDAE							
<i>Coryphaena hippurus</i>	Linnaeus, 1758	common dolphinfish	Wi;W	Trop.CIRCUM	a	pelagic	r
RACHYCENTRIDAE							
<i>Rachycentron canadus</i>	(Linnaeus, 1766)	cobia	JR;W	Trop. IWCP & Atlantic	a	3-40 m	u
LUTJANIDAE							
<i>Aprion virescens</i>	Valenciennes, 1830	green jobfish	JR	Trop.IWCP	a	10-24 m	u
<i>Etelis carbunculus</i>	Curvier, 1828	king snapper	boat fisher ("Four-mile Reef")	Trop.IWCP	a	>100 m	
<i>Lutjanus adetii</i>	(Castelnau, 1873)	hussar	JR	*Trop.WP	a	5-15 m	r
<i>Lutjanus argentimaculatus</i>	(Forsskål, 1775)	mangrove jack	JR;W	Trop.IWCP	a	15-40 m	u
<i>Lutjanus bohar</i>	(Forsskål, 1775)	red bass	JR	Trop.IWCP	j (25 cm)	15 m	u
<i>Lutjanus fulvislammus</i>	(Forsskål, 1775)	black-spot snapper	JR;LH	*Trop.IWCP	a	2 m	o
<i>Lutjanus gibbus</i>	(Forsskål, 1775)	paddletail	JR	*Trop.IWCP	a	15 m	u
<i>Lutjanus kasmira</i>	(Forsskål, 1775)	blue-stripe seaperch	JR	Trop.IWCP	a	5-24 m	o
<i>Lutjanus malabaricus</i>	Bloch & Schneider, 1801	saddled-tailed seaperch	JR	*Trop.IWP	a	24 m	r
<i>Lutjanus russelli</i>	(Bleeker, 1849)	moses perch	JR;LH;Wi;W	Trop.IWCP	a	5-40m	o
<i>Paracaesio xanthurus</i>	Bleeker, 1869	southern fusilier	JR;Wi;W	Trop./Temp.SWP	a	pelagic	c
CAESIONIDAE							
<i>Caesio caerulea</i>	Lacepède, 1801	gold-banded fusilier	JR	*Trop.IWCP	a	pelagic	r
<i>Pterocaesio chrysozona</i>	(Kahl & van Hasselt, 1830)	gold-band fusilier	JR	Trop.ISWP	a	pelagic	u
<i>Pterocaesio digramma</i>	(Bleeker, 1865)	black-tipped fusilier	JR;W	Trop.IWCP	a	pelagic	o

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NEMIPTERIDAE							
<i>Pentapodus paradiseus</i>	(Günther, 1859)	paradise butterflyfish	JR (AM)	Trop.WSWP	a	pelagic (angled)	r
<i>Pentapodus</i> sp.		blue butterflyfish	JR	Trop.CP	a	10-18 m	u
<i>Scolopsis bilineata</i>	(Bloch, 1793)	bridled monocle bream	JR	Trop.IWCP	sa(10 cm)	10-18 m	u
<i>Scolopsis lineata</i>	Quoy & Gaimard, 1824	lined monocle bream	JR	Trop.IWCP	sa		u
GERREIDAE							
<i>Gerres subfasciatus</i>	Cuvier, 1830	roach	JR;LH;Wi;BC	Trop./Temp.IWCP(endemic)	a	1-15 m	o
HAEMULIDAE							
<i>Diagramma labiosum</i>	(Thunberg, 1792)	painted sweetlips	JR	Trop.IWCP	a	2-24 m	u
<i>Plectorhynchus lessoni</i>	Linnaeus, 1758	striped sweetlips	JR	*Trop.CWP	j(10 cm)	2-24 m	u
<i>Plectorhynchus gibbosus</i>	(Lacepède, 1802)	brown sweetlips	JR;LH;BC	Trop.IWCP	a	2-24 m	o
<i>Plectorhynchus flavomaculatus</i>	Ehrenberg, 1830	gold-spot sweetlips	JR;Wi	Trop./Temp.IWCP	a	2-24 m	c
<i>Plectorhynchus picus</i>	(Cuvier, 1830)	dotted sweetlips	JR;W	Trop.CWP	a	2-40 m	u
<i>Plectorhynchus schotaf</i>	(Forsskål, 1775)	somber sweetlips	stringers	Trop.IWSWP	a	3 m	u
LETHRINIDAE							
<i>Gnathodentex aomineatus</i>	(Lacepède, 1802)	gold-lined sea bream	JR	Trop.IWSWP	a	15 m	u
<i>Leithrinus genivittatus</i>	Valenciennes, 1830	thread-fin emperor	JR(AM)	Trop.IWP	a	8-24 m	u
<i>Leithrinus laticaudus</i>	Alleyne & Macley, 1877	grass emperor	JR	Trop.IWP	a	10-24 m	u
<i>Leithrinus miniatulus</i>	(Bloch & Schneider, 1801)	sweetlip emperor	JR	*Trop.WP	sa	10 m	u
<i>Leithrinus nebulosus</i>	(Forsskål, 1775)	spangled emperor	JR;LH	Trop./Subtrop.IWCP	a	10-24 m	u
<i>Monotaxis grandoculis</i>	(Forsskål, 1775)	bigeye	JR	Trop.IWCP	sa	10-24 m	u
SPARIDAE							
<i>Acanthopagrus australis</i>	(Owen, 1853)	yellowfin bream	JR;LH;Wi;W;BC	Temp./Subtrop.SWP (endemic)	a	1-40m	c
<i>Pagrus auratus</i>	(Bloch & Schneider, 1801)	snapper	JR;Wi;W	Temp.SWP	a	1-40m	c
<i>Rhabdosargus sarba</i>	(Forsskål, 1775)	tarwhine	JR;LH;Wi;W	Temp.(east)ISWP	a	1-40m	c
SCIAENIDAE							
<i>Argyrosomus japonicus</i>	(Temminck & Schlegel, 1844)	mulloway	JR;W	Temp.(east)ISWP	a	10-40 m	o
MULLIDAE							
<i>Mulloidichthys vanicolensis</i>	(Valenciennes, 1831)	gold-stripe goatfish	JR	*Trop.IWCP	a	2-18 m	u
<i>Parupeneus ciliatus</i>	(Lacepède, 1801)	cardinal goatfish	LH	Trop.IWCP	a	2 m	u
<i>Parupeneus cyclostomus</i>	(Lacepède, 1801)	gold-saddled goatfish	JR	Trop.IWCP	a	10-24 m	u
<i>Parupeneus indicus</i>	(Shaw, 1803)	Indian goatfish	LH	*Trop.IWP	a	2 m	u
<i>Parupeneus multifasciatus</i>	(Quoy & Gaimard, 1825)	banded goatfish	JR;LH;Wi	*Trop.IWP	a	1-24 m	o
<i>Parupeneus pleurostigma</i>	(Bennett, 1830)	sidespot goatfish	JR	*Trop.IWCP	a	10-24 m	u
<i>Parupeneus spilurus</i>	(Bleeker, 1854)	blackspot goatfish	JR;LH;Wi;W	Temp./Trop.(east)ISWP	a	1-40 m	c
<i>Upeneichthys lineatus</i>	(Bloch & Schneider, 1801)	blue-stripe goatfish	JR;LH;Wi	Temp.SWP	a	2-24 m	o
<i>Upeneus tragula</i>	Richardson, 1846	bar-tailed goatfish	JR	Trop.ISWP	a	10-24 m	u
MONODACTYLIDAE							
<i>Monodactylus argenteus</i>	(Linnaeus, 1758)	diamond fish	JR;LH;W;BC	Trop./Subtrop.IWP	a	pelagic	u
<i>Schuettenia scalaripinnis</i>	Steindachner, 1866	ladder-finned pomfret	JR;Wi	Trop./Subtrop.IWP (endemic)	a	2-20 m	o
PEMPHERIDAE							
<i>Pempheris affinis</i>	McCulloch, 1911	black-tipped bullseye	JR;Wi	Subtrop.SWP(endemic)	a	2-24 m	c
<i>Pempheris analis</i>	Waite, 1910	bronze bullseye	JR	Subtrop.IWP	a	2-24 m	o
<i>Pempheris compressa</i>	(Shaw, 1790)	small-scaled bullseye	JR	*Temp.SWP(endemic)	a	15-24 m	u
KYPHOSIDAE							
<i>Kyphosus sydneyanus</i>	(Günther, 1886)	silver drummer	JR;W	Temp.ISWP	a	1-30 m	o
<i>Kyphosus vaigiensis</i>	(Quoy & Gaimard, 1825)	low-finned drummer	JR	Trop.IWCP	a	1-24 m	o
GIRELLIDAE							
<i>Girella elevata</i>	Macleay, 1881	eastern rock blackfish	JR	Temp./Subtrop.SWP (endemic)	a	1-10 m	o
<i>Girella tricuspidata</i>	(Quoy & Gaimard, 1824)	luderick	JR;LH;BC	Temp.SWP	a	1-10 m	o

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
MICROCANTHIDAE							
<i>Atypichthys strigatus</i>	(Günther, 1860)	mado	JR;LH;Wi;W	Temp.SWP	a	pelagic to 40 m	c
<i>Microcanthus strigatus</i>	(Cuvier, 1831)	stripey	JR;LH;Wi;W;BC	Temp.IWCP(antitropical)	a	1-40 m	c
SCORPIDIDAE							
<i>Scorpius lineolata</i>	Kner, 1865	silver sweep	JR;LH;Wi;W	Temp./Subtrop.IWCP	a	pelagic	c
EPHIPPIDIDAE							
<i>Platax batavianus</i>	Cuvier, 1831	hump-headed batfish	JR	*Trop.WCSWP	a	pelagic	r
<i>Platax orbicularis</i>	(Forsskal, 1775)	narrow-banded batfish	JR	*Trop.IWCP	a	pelagic	o
<i>Platax pinnatus</i>	(Linnaeus, 1758)	long-finned batfish	JR	*Trop.WCP	a	pelagic	u
<i>Platax tiera</i>	(Forsskal, 1775)	round-faced batfish	JR	Trop.IWCP	a	pelagic	u
SCATOPHAGIDAE							
<i>Selenotoca multifasciata</i>	(Richardson, 1846)	striped scat	JR	*Trop.IWCP	a	pelagic	u
CHAETODONTIDAE							
<i>Amphichaetodon howensis</i>	(Waite, 1903)	Lord Howe coralfish	JR	Subtrop.SWP	a	8-23 m	u
<i>Chaetodon auriga</i>	Forsskal, 1775	thread-fin butterflyfish	JR;LH	Trop.IWCP	a	1-20 m	o
<i>Chaetodon citrinellus</i>	Cuvier, 1831	speckled butterflyfish	JR;LH	Trop.IWCP	a	1-20 m	c
<i>Chaetodon flavivostis</i>	Günther, 1873	black butterflyfish	JR;LH;W	Trop.CWP	a	1-40 m	o
<i>Chaetodon guentheri</i>	Ahl, 1913	Günther's butterflyfish	JR;LH;Wi;W	Subtrop.WSWP (antiequatorial)	a	1-40 m	c
<i>Chaetodon kleinii</i>	Bloch, 1790	Klein's butterflyfish	JR;Wi;W	Trop.IWCP	a	1-40 m	c
<i>Chaetodon lineolatus</i>	Cuvier, 1831	lined butterflyfish	JR	Trop.IWCP	a	1-20 m	o
<i>Chaetodon lunula</i>	(Lacepède, 1803)	raccoon butterflyfish	JR;LH	Trop.IWCP	a	1-20 m	o
<i>Chaetodon melanotus</i>	Bloch & Schneider, 1801	blackback butterflyfish	JR	Trop.IWCP	a	1-20 m	o
<i>Chaetodon mertensii</i>	Cuvier, 1831	Merten's butterflyfish	JR	*Trop.IWCP	a	15 m	r
<i>Chaetodon pelewensis</i>	Kner, 1868	dot-and-dash butterflyfish	JR	*Trop.CWP	a	10-24 m	r
<i>Chaetodon plebeius</i>	Cuvier, 1831	blue-spot butterflyfish	JR	Trop.IWCP	a	10-24 m	u
<i>Chaetodon rainfordi</i>	McCulloch, 1923	Rainford's butterflyfish	JR	Trop.IWP(endemic)	a	5-24 m	o
<i>Chaetodon speculum</i>	Cuvier, 1831	oval-spot butterfly fish	JR	*Trop.IWCP	a	10-24 m	r
<i>Chaetodon trifasciatus</i>	Quoy & Gaimard, 1824	chevroned butterflyfish	JR	Trop.IWCP	a	10-24 m	u
<i>Chaetodon unimaculatus</i>	Bloch, 1787	teardrop butterflyfish	JR	Trop.IWCP	a	10-24 m	u
<i>Chaetodon vagabundus</i>	Linnaeus, 1758	vagabond butterflyfish	JR;LH	Trop.IWP(endemic)	a	10-24 m	o
<i>Chelmon rostratus</i>	(Linnaeus, 1758)	beaked coralfish	JR	*Trop.IWCP	a	10-24 m	r
<i>Chelmonops truncatus</i>	(Kner, 1854)	eastern talma	JR;LH;Wi	Temp.SWP	a	3-24 m	o
<i>Coradion chrysozonus</i>	(Cuvier, 1831)	orange-banded butterflyfish	Wi	*Trop.WP	a	10-24 m	r
<i>Forcipiger flavissimus</i>	Jordan & McGregor, 1898	long-nosed butterflyfish	JR	Trop.IWCP	a	5-24 m	u
<i>Hemitaurichthys polylepis</i>	(Bleeker, 1857)	pyramid butterflyfish	JR	*Trop.IWP	a	22 m	r
<i>Heniochus acuminatus</i>	(Linnaeus, 1758)	long-fin bannerfish	JR;Wi;W	Trop.IWCP	a	10-40 m	o
<i>Heniochus chrysostomus</i>	Cuvier, 1831	pennant bannerfish	JR	*Trop.IWP	a	10-24 m	r
<i>Heniochus diphreutes</i>	Jordan, 1903	schooling bannerfish	JR;W	Trop.IWCP	a	10-40 m	u
<i>Heniochus singularius</i>	Smith & Radcliffe, 1911	singular bannerfish	JR	*Trop.IWP	a	10-24 m	r
POMACANTHIDAE							
<i>Centropyge bicolor</i>	(Bloch, 1787)	bicolor angelfish	JR;Wi	Trop.IWP	a	5-24 m	u
<i>Centropyge bispinosus</i>	(Günther, 1860)	coral beauty	JR	Trop.IWP	a	5-24 m	u
<i>Centropyge flavicauda</i>	Fraser-Brunner, 1933	royal blue pigmy angelfish	JR	Trop.IWP	a	5-24 m	r
<i>Centropyge flavissimus</i>	(Cuvier, 1831)	lemonpeel angelfish	JR	*Trop.IWCP	a	5-24 m	u
<i>Centropyge heraldi</i>	Woods & Schultz, 1953	Herald's angelfish	JR	Trop.IWP	a	5-24 m	r
<i>Centropyge libicen</i>	(Cuvier, 1831)	keyhole angelfish	JR;Wi;W	Trop.IWP	a	5-40 m	c
<i>Centropyge urolithi</i>	(Bleeker, 1853)	pearl-scaled angelfish	JR	Trop.IWP	a	5-24 m	o
<i>Chaetodontoplus conspicillatus</i>	(Waite, 1900)	conspicuous angelfish	JR	Subtrop.SWP	a	18 m	u
<i>Chaetodontoplus meredithi</i>	Kuiter, 1990	yellowtail angelfish	JR	Trop.WP(endemic)	a	5-24 m	u
<i>Genicanthus watanabei</i>	(Yasuda & Tominaga, 1970)	Watanabe's angelfish	JR	*Trop.WP	j(5 cm)	10 m	r
<i>Pomacanthus imperator</i>	(Bloch, 1787)	emperor angelfish	JR	*Trop.IWP	a	15 m	r
<i>Pomacanthus semicirculatus</i>	(Cuvier, 1831)	semicircle angelfish	JR	Trop.IWP	a	5-24 m	u
<i>Pomacanthus sexstriatus</i>	(Cuvier, 1831)	six-banded angelfish	JR	*Trop.WSWP	j(8 cm)	10 m	r

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ENOPLIDAE							
<i>Enoplosus armatus</i>	(Shaw, 1790)	old wife	JR;LH;Wi;W	Temp.ISWP(endemic)	a	2-40 m	o
PENTACEROTIDAE							
<i>Paristioporus labiasus</i>	(Günther, 1871)	giant boarfish	JR	Temp.SWP	a	24 m	u
POMACENTRIDAE							
<i>Abudefduf bengalensis</i>	(Bloch, 1787)	narrow-banded sergeant major	JR;LH;Wi	Trop.IWP	a(b)	1-24 m	o
<i>Abudefduf sexfasciatus</i>	(Lacepède, 1802)	scissor-tail sergeant major	JR;LH	Trop.IWCFP	a	1-3 m	u
<i>Abudefduf sonchus</i>	(Forsskal, 1775)	black-spot sergeant major	JR	*Trop.IWCP	a	1-3 m	r
<i>Abudefduf vaigiensis</i>	(Quoy & Gaimard, 1825)	Indo-Pacific sergeant major	JR;LH;W	Trop.IWCP	a(b)	1-40 m	c
<i>Abudefduf whitleyi</i>	Allen & Robertson, 1974	Whitley's sergeant	JR;LH	Trop.CWP	a(b)	1-24 m	o
<i>Amphiprion akindynos</i>	Allen, 1972	barrier reef anemonefish	JR	Trop.WSWP	a(b)	6-24 m	o
<i>Amphiprion latezonatus</i>	Waite, 1900	wide-striped clownfish	JR	Subtrop.SWP (endemic)	a(b)	6-24 m	o
<i>Amphiprion perideraion</i>	Bleeker, 1855	pink anemonefish	JR	*Trop.CWP	a	8 m	r
<i>Chromis chrysura</i>	(Bliss, 1883)	stout-body chromis	JR	Trop.ISWP	a	10-20 m	u
<i>Chromis flavomaculata</i>	Kamohara, 1960	yellow-spotted chromis	JR	Subtrop.WSWP (antiequatorial)	a	10-20 m	u
<i>Chromis hypolepis</i>	Günther, 1867	one-spot puller	JR;Wi;W	Temp.SWP	a(b)	2-40 m	c
<i>Chromis margaritifer</i>	Fowler, 1946	bicolour chromis	JR	*Trop.WP	a	8-24 m	o
<i>Chromis nitida</i>	(Whitley, 1928)	shining puller	JR;Wi;W	Trop.WCSWP	a(b)	2-40 m	o
<i>Chromis vanderbilii</i>	(Fowler, 1941)	Vanderbilt's chromis	JR	*Trop.WSWP	a	3-15 m	u
<i>Chromis weberi</i>	Fowler & Bean, 1928	Webber's chromis	JR	*Trop.IWCP	a	3-24 m	o
<i>Chrysiptera flavipinnis</i>	(Allen & Robertson, 1974)	yellow-fin demoiselle	JR;LH	Trop.WSWP	a	3-15 m	o
<i>Chrysiptera glauca</i>	(Cuvier, 1830)	grey damsel	LH	*Trop.IWCP	a	<1 m	u
<i>Chrysiptera leucopoma</i>	(Lesson, 1830)	surge demoiselle	JR;LH	*Trop.IWCP	a	<3 m	o
<i>Chrysiptera rex</i>	(Snyder, 1909)	king demoiselle	JR;LH	*Trop.IWCP	a	1-15 m	u
<i>Chrysiptera talboti</i>	(Allen, 1975)	Talbot's damsel	JR	*Trop.CWP	a	5-15 m	u
<i>Dascyllus reticulatus</i>	(Richardson, 1846)	reticulated dascyllus	JR	*Trop.IWP	a	5-24 m	u
<i>Dascyllus trimaculatus</i>	(Rüppell, 1828)	three-spot humbug	JR	Trop.IWSWP	a	5-24 m	o
<i>Mecanichthys immaculatus</i>	(Ogilby, 1885)	immaculate damsel	JR;LH;Wi	Temp./Subtrop.SWP (endemic)	a(b)	1-24 m	o
<i>Neopomacentrus azyrnus</i>	(Bleeker, 1877)	yellowtail demoiselle	JR	Trop.IWP	a	2-8 m	u
<i>Neopomacentrus cyanomos</i>	(Bleeker, 1856)	regal demoiselle	JR	*Trop.IWP	a	2-8 m	r
<i>Parma micralepis</i>	Günther, 1862	white ear	JR;LH;Wi	Temp./Subtrop.SWP (endemic)	a	5-18 m	o
<i>Parma oligolepis</i>	Whitley, 1929	big-scaled parma	JR;LH;Wi;W	Subtrop.SWP (endemic)	a(b)	2-40 m	c
<i>Parma polylepis</i>	Günther, 1862	banded parma	JR	Subtrop.SWP	a(b)	2-24 m	c
<i>Parma unifasciata</i>	(Steindachner, 1867)	girdled parma	JR;LH;Wi;W	Subtrop.SWP (endemic)	a(b)	2-40 m	c
<i>Plectroglyphidodon dickii</i>	(Liénard, 1839)	Dick's damsel	JR	*Trop.IWP	a	5-10 m	r
<i>Plectroglyphidodon johnstonianus</i>	Fowler & Ball, 1924	Johnston damsel	JR	*Trop.IWCP	a	8 m	u
<i>Plectroglyphidodon leucozonus</i>	(Bleeker, 1859)	white-band damsel	JR;LH	*Trop.IWP	a(b)	<9m	o
<i>Pomacentrus amboinensis</i>	Bleeker, 1868	ambon damsel	JR	*Trop.IWP	a	10 m	r
<i>Pomacentrus australis</i>	Allen & Robertson, 1973	Australian damsel	JR;Wi	Trop./Subtrop.IWP (endemic)	a	6-24 m	o
<i>Pomacentrus bankanensis</i>	Bleeker, 1853	speckled damsel	JR	*Trop.IWCP	a	3-10m	o
<i>Pomacentrus chrysurus</i>	Cuvier, 1830	whitetail damsel	JR	Trop.WP	a	<9m	u
<i>Pomacentrus coelestis</i>	Jordan & Starks, 1901	neon damsel	JR;Wi	Trop.WSWP	a	3-24 m	c
<i>Pomacentrus nagasakiensis</i>	Tanaka, 1909	sandy damsel	JR	*Trop.IWP	a	6-24 m	o
<i>Pomacentrus nigromarginatus</i>	Allen, 1973	black-margined damsel	JR	*Trop.IWP	a	15-24 m	o
<i>Pomacentrus vaiuli</i>	Jordan & Seale, 1906	princess damsel	JR	*Trop.WP	a	6-15 m	u
<i>Pomacentrus wardi</i>	Whitley, 1927	Ward's damsel	JR	Trop.WSWP	a	15 m	u
<i>Stegastes apicalis</i>	(De Vis, 1885)	Australian gregory	JR	Trop.WSWP	a	10 m	u
<i>Stegastes gascognei</i>	(Whitley, 1964)	Coral Sea gregory	JR;LH	Trop.WSWP	a	3-24 m	o

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
CIRRHITIDAE							
<i>Cirrhitichthys aprinus</i>	(Cuvier, 1829)	blotched hawkfish	JR;Wi;W	Trop.WSWP	a	3–40 m	u
<i>Cirrhitichthys falco</i>	Randall, 1963	falcon hawkfish	JR;Wi	Trop.WSWP	a	3–20 m	o
<i>Cirrhitus splendens</i>	(Ogilby, 1889)	splendid hawkfish	JR	*Subtrop.SWP(endemic)	a	9 m	u
<i>Cirrhitichthys oxycephalus</i>	(Bleeker, 1855)	sharp-headed hawkfish	JR;Wi;W	Trop.IWSWP	a	3–20 m	u
<i>Cyprinocirrhites polyactis</i>	(Bleeker, 1875)	lyre-tail hawkfish	JR;W	Trop.IWSWP	a	6–40 m	o
<i>Paracirrhites arcatus</i>	(Cuvier, 1829)	ring-eyed hawkfish	JR	*Trop.IWCP	a	8–15 m	u
<i>Paracirrhites fosteri</i>	(Schneider, 1801)	freckled hawkfish	JR	*Trop.IWCP	a	8–15 m	u
CHIRONEMIDAE							
<i>Chironemus marmoratus</i>	Günther, 1860	eastern kelpfish	JR;Wi	*Temp.SWP	a	<15 m	c
APODACTYLIDAE							
<i>Crinodus lophodon</i>	Günther, 1859	rock cale	JR	Temp./Subtrop.SWP (endemic)	a	<2 m	c
CHEILODACTYLIDAE							
<i>Cheilodactylus fuscus</i>	Castelnau, 1879	red morwong	JR;LH;Wi;W	Temp./Subtrop.SWP	a	1–40 m	c
<i>Cheilodactylus vestitus</i>	(Castelnau, 1879)	crested morwong	JR;LH;Wi;W	Subtrop/Trop.SWP	a	1–40 m	o
<i>Nemadactylus douglasi</i>	(Hector, 1875)	blue morwong	JR	Temp.SWP	a	15–24 m	o
MUGILIDAE							
<i>Listia argentea</i>	Quoy & Gaimard, 1825	flat-tail mullet	BC	Temp./Trop.ISWP (endemic)	a	<2 m	c
<i>Mugil cephalus</i>	Linnaeus, 1758	sea mullet	BC	Temp./Trop.CIRCUM	a	<3 m	c
<i>Myxus elongatus</i>	Günther, 1861	sand mullet	BC	Trop./Temp.IWSWP	a	<3 m	c
SPHYRAENIDAE							
<i>Sphyræna barracuda</i>	(Walbaum, 1792)	barracuda	JR	Trop.IWCP	a	pelagic	u
<i>Sphyræna obtusata</i>	Cuvier, 1829	striped seapike	JR;LH;Wi	Trop.IWCP	a	10–15 m	o
LABRIDAE							
<i>Achoerodus viridis</i>	(Steindachner, 1866)	eastern blue groper	JR;LH;W	Temp./Subtrop.SWP (endemic)	a	1–40 m	c
<i>Anampses caeruleopunctatus</i>	Rüppell, 1828	spotted chisel-toothed wrasse	JR	Trop.IWCP	a	3–24 m	o
<i>Anampses elegans</i>	Ogilby, 1889	elegant wrasse	JR	*Temp./Subtrop.SWP	a	15–24 m	u
<i>Anampses femininus</i>	Randall, 1972	feminine wrasse	JR	Subtrop.CP	a	10–24 m	u
<i>Anampses geographicus</i>	Valenciennes, 1839	geographic wrasse	JR;LH	Trop.IWCP	a	1–24 m	o
<i>Anampses meleagrides</i>	Valenciennes, 1840	yellowtail wrasse	JR	Trop.IWCP	a	3–10 m	u
<i>Anampses neoguinaicus</i>	Bleeker, 1878	New Guinea wrasse	JR	Trop.IWCP	a	5–24 m	u
<i>Austrolabrus maculatus</i>	(Macleay, 1881)	black-spotted wrasse	JR	Temp.IWCP	a	5–24 m	u
<i>Bodianus axillaris</i>	(Bennett, 1831)	axil pigfish	JR	Trop.IWCP	a	15 m	o
<i>Bodianus diana</i>	(Lacepède, 1801)	Diana's hogfish	JR	Trop.IWCP	j(5 cm)	15 m	u
<i>Bodianus frenchii</i>	(Klunzinger, 1879)	foxfish	JR	Temp.ISWP	a	10–24 m	u
<i>Bodianus loxozonus</i>	(Snyder, 1908)	blackfin hogfish	W	Trop.WSWP	j(5 cm)	40 m	r
<i>Bodianus mesothorax</i>	(Bloch & Schneider, 1801)	split-level hogfish	JR	Trop.WCSWP	j(5 cm)	15–24 m	u
<i>Bodianus perditio</i>	(Quoy & Gaimard, 1835)	gold-spot pigfish	JR;Wi (AM)	Temp.IWCP (antiequatorial in WP)	a	15–24 m	u
<i>Bodianus unimaculatus</i>	(Günther, 1862)	pigfish	JR	Temp.SWP	a	15–24 m	r
<i>Cheilinus bimaculatus</i>	Valenciennes, 1840	two-spot maori wrasse	JR	Trop.IWCP	a	10–24 m	u
<i>Cheilinus chlorurus</i>	(Bloch, 1791)	floral maori wrasse	JR	Trop.IWCP	a	10–24 m	u
<i>Cheilio inermis</i>	(Forsskål, 1775)	sharp-nosed wrasse	JR;LH	Temp.IWCP	a	2–24 m	u
<i>Choerodon fasciatus</i>	(Günther, 1867)	harlequin tuskfish	JR	Trop.IWP	j(5 cm)	10–18 m	r
<i>Choerodon graphicus</i>	(De Vis, 1885)	graphic tuskfish	JR	*Trop.WSWP	a	1–18 m	r
<i>Choerodon schoenleinii</i>	Valenciennes, 1839	black-spot tuskfish	JR	Trop.IWP	a	10–18 m	u
<i>Choerodon venustus</i>	De Vis, 1884	venus tuskfish	boat fisher	Trop.IWP(endemic)	a	80 m	o
<i>Cirrhitilabrus punctatus</i>	Randall & Kuiter, 1989	black finned wrasse	JR;LH;W	Trop.WCSWP	a	3–40 m	o
<i>Coris aurilineata</i>	Randall & Kuiter, 1982	gold-lined coris	JR	Subtrop.SWP(endemic)	a	10–24 m	u
<i>Coris aygula</i>	Lacepède, 1801	hump-headed wrasse	JR	Trop.IWCP	a	5–14 m	u
<i>Coris batuensis</i>	Bleeker, 1856	dapple coris	JR;LH	Trop.IWP	a	10–24 m	u
<i>Coris dorsomaculata</i>	Fowler, 1908	pink-lined wrasse	JR;JR;Wi	Trop.WSWP	a	3–24 m	c

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
LABRIDAE — continued							
<i>Coris gaimard</i>	(Quoy & Gaimard, 1824)	red-finned rainbowfish	JR	Trop.IWCP	a	5–24 m	u
<i>Coris pida</i>	(Bloch & Schneider, 1801)	comb wrasse	JR;LH;Wi;W	Subtrop/Temp.SWP	a	3–40 m	c
<i>Coris sandageri</i>	Hector, 1884	eastern king wrasse	JR	Temp./Subtrop.SWP	a	10–24 m	r
<i>Eupetrichthys angustipes</i>	Ramsay & Ogilby, 1888	snakeskin wrasse	JR	*Temp.SWP	a	10–24 m	u
<i>Halichoeres biocellatus</i>	Schultz, 1960	red-lined wrasse	JR	Trop.IWCP	a	10–20 m	u
<i>Halichoeres chrysus</i>	Randall, 1980	yellow wrasse	JR	Trop.IWCP	a	10–20 m	u
<i>Halichoeres hartfeldi</i>	Bleeker 1852	orange-lined wrasse	JR	Trop.IWP	a	10–24 m	u
<i>Halichoeres hortulanus</i>	(Lacepède, 1801)	four-spot wrasse	JR	Trop.IWCP	a	3–24 m	u
<i>Halichoeres margaritaceus</i>	(Valenciennes, 1839)	saddled rainbowfish	JR;LH;Wi	Trop.IWCP	a	3–24 m	o
<i>Halichoeres marginatus</i>	Rüppell, 1835	spectacled rainbowfish	JR;LH	Trop.IWCP	a	1–24 m	c
<i>Halichoeres nebulosus</i>	(Valenciennes, 1839)	clouded rainbowfish	JR;LH	Trop.IWCP	a	5–15 m	u
<i>Halichoeres prosopion</i>	(Bleeker, 1853)	two-tone wrasse	JR	Trop.WCP	a	5–15 m	u
<i>Halichoeres trimaculatus</i>	(Quoy & Gaimard, 1834)	three-spot wrasse	LH	*Trop.IWP	a	<2 m	o
<i>Hemigymnus fasciatus</i>	(Bloch, 1792)	five-banded wrasse	JR	Trop.IWCP	a	10–24 m	o
<i>Hemigymnus melapterus</i>	(Bloch, 1791)	thick-lipped wrasse	JR	Trop.IWCP	a	10–24 m	u
<i>Hologymnosus annulatus</i>	(Lacepède, 1801)	ringed slender wrasse	JR	Trop.IWCP	a	10–24 m	u
<i>Hologymnosus doliaius</i>	(Lacepède, 1801)	ringed wrasse	JR	Trop.IWCP	a	10–24 m	u
<i>Hologymnosus longipes</i>	(Günther, 1862)	side-spot ringwrasse	JR	Trop.WP	a	10–24 m	u
<i>Labroides dimidiatus</i>	(Valenciennes, 1839)	cleaner fish	JR;LH;Wi;W	Trop.IWCP	a	1–40 m	c
<i>Leptofulvis cyanopleura</i>	(Bleeker, 1853)	blue-sided wrasse	JR;LH	Trop.IWCP	a	1–24 m	o
<i>Macropharyngodon choati</i>	Randall, 1978	Choat's wrasse	JR	Subtrop.SWP	a	3–24 m	o
<i>Macropharyngodon kuiteri</i>	Randall, 1978	Kuiter's wrasse	JR	Trop.WSWP	a	3–24 m	o
<i>Macropharyngodon meleagris</i>	(Valenciennes, 1839)	leopard wrasse	JR	Trop.IWSWP	a	3–24 m	o
<i>Macropharyngodon negrasensis</i>	Herre, 1932	black leopard wrasse	JR	Trop.WSWP	a	3–24 m	o
<i>Nololabrus gymnotus</i>	(Günther, 1862)	crimson-banded wrasse	JR;LH;Wi;W	Subtrop/Temp.SWP (endemic)	a	3–40 m	c
<i>Navaculichthys macrolepidotus</i>	(Bloch, 1791)	seagrass wrasse	JR	Trop.IWP	a	15 m	r
<i>Navaculichthys taeniurus</i>	(Lacepède, 1801)	carpet wrasse	JR;LH	*Trop.IWCP	a	1–20 m	u
<i>Ophthalmolepis lineolata</i>	(Valenciennes, 1838)	maori wrasse	JR;Wi;W	Temp.ISWP	a	10–40 m	o
<i>Picilabrus latidorsus</i>	(Richardson, 1939)	senator wrasse	JR	Temp.ISWP	a	10–24 m	u
<i>Pseudocheilinus hexataenia</i>	(Bleeker, 1857)	six-stripe wrasse	LH	*Trop.IWCP	a	2 m	r
<i>Pseudocoris yamashiroi</i>	(Schmidt, 1930)	pink wrasse	JR	Trop.IWSWP	a	10–15 m	u
<i>Pseudojuloides cerasinus</i>	(Snyder, 1904)	long blue-lined wrasse	JR;LH;Wi	Trop.IWCP	a	10–24 m	o
<i>Pseudojuloides elongatus</i>	Ayling & Russell, 1977	long green wrasse	JR	Trop/Temp.IWSWP	a	10–24 m	u
<i>Pseudolabrus guentheri</i>	Bleeker, 1862	Günther's wrasse	JR;LH;Wi;W	Subtrop.SWP(endemic)	a	3–40 m	c
<i>Pteragogus cryptus</i>	Randall, 1981	cryptic wrasse	JR;Wi	Trop.IWP	a	6–18 m	u
<i>Pteragogus enneacanthus</i>	(Bleeker, 1856)	cockereel wrasse	JR	Trop.IWCP	a	6–24 m	u
<i>Stethojulis bandanensis</i>	(Bleeker, 1851)	red-spot wrasse	JR;LH	Trop.IWCP	a	1–24 m	c
<i>Stethojulis interrupta</i>	(Bleeker, 1851)	broken-lined wrasse	JR;LH	Trop.IWCP	a	1–24 m	u
<i>Stethojulis strigiventer</i>	(Bennett, 1832)	silver-streaked wrasse	JR	Trop.IWSWP	a	3–15 m	u
<i>Suezichthys argenteus</i>	Russell, 1985	painted rainbow wrasse	JR	Trop/Subtrop.SWP	a	5–24 m	o
<i>Suezichthys devisi</i>	Whitley, 1941	gracilis wrasse	JR	Trop./Temp.IWP (endemic)	a	10–24 m	u
<i>Thalassoma amblycephalum</i>	(Bleeker, 1856)	blunt-headed wrasse	JR;LH;Wi;W	Trop.IWCP	a	1–40 m	o
<i>Thalassoma janseni</i>	(Bleeker, 1856)	Jansen's wrasse	JR	Trop.IWCP	a	<5 m	c
<i>Thalassoma lunare</i>	(Linnaeus, 1758)	moon wrasse	JR;LH;Wi;W	Trop.IWCP	a	1–40m	c
<i>Thalassoma lutescens</i>	(Lay & Bennett, 1839)	green moon wrasse	JR;LH;Wi;W	Trop.IWCP	a	3–40 m	c
<i>Thalassoma purpuraceum</i>	(Forsskal, 1775)	surge wrasse	JR	Trop.IWCP	a	<3 m	u
<i>Xyrichtys pavo</i>	Valenciennes, 1840	pavo razorfish	JR	*Trop.IWCP	a	8–18 m	u
ODACIDAE							
<i>Odax acroptilus</i>	(Richardson, 1846)	rainbow cale	Tasman II (Clarks Beach)	*Temp.ISWP(endemic)	a	6 m	u
<i>Odax cyanomelas</i>	(Richardson, 1850)	herring cale	"Middle Reef" (Clarks Beach)	*Temp.ISWP(endemic)	a	5 m	u

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
SCARIDAE							
<i>Cetoscarus bicolor</i>	(Rüppell, 1829)	bicolour parrotfish	JR	*Trop.IWCP	a	10–24 m	u
<i>Scarus altipinnis</i>	(Steindachner, 1879)	minifin parrotfish	JR	*Trop.IWCP	a	5–24 m	u
<i>Scarus frenatus</i>	Lacepède, 1802	bridled parrotfish	JR	*Trop.IWCP	j(7 cm)	9–15 m	u
<i>Scarus ghobban</i>	Forsskål, 1775	blue-barred orange parrotfish	JR;W	Trop.IWCP	a	3–24 m	o
SUBFAMILY SPARISOMATINAE							
<i>Leptoscarus vaigiensis</i>	(Quoy & Gaimard, 1824)	seagrass parrotfish	JR	Trop.ISWP	a	5–18 m	o
PINGUIPEDIDAE							
<i>Parapercis clathrata</i>	Ogilby, 1911	latticed grubfish	JR	*Temp.IWP	a	8–24 m	u
<i>Parapercis cylindrica</i>	(Bloch, 1797)	cylindrical grubfish	JR;LH	*Trop.IWP	a	5–24 m	u
<i>Parapercis ramsayi</i>	(Steindachner, 1884)	spotted grubfish	JR	Temp.ISWP (endemic)	a	5–24 m	o
<i>Parapercis striciceps</i>	(De Vis, 1884)	white-streaked grubfish	JR	Subtrop.SWP (endemic)	a	8–24 m	u
LEPTOSCOPIIDAE							
<i>Lesueurina platycephala</i>	Fowler, 1907	flat-head pigmy stargazer	beach fisher (Clarks Beach)	Temp.ISWP	sa	beach catch	u
BLENNIIDAE							
<i>Aspidontus dussumieri</i>	(Valenciennes, 1836)	slender sabre-toothed blenny	JR	Trop.IWCP	a	3–24 m	o
<i>Aspidontus taeniatus</i>	Quoy & Gaimard, 1834	false cleaner fish	JR	Trop.IWCP	a	3–24 m	u
<i>Meiacanthus atrodorsalis</i>	(Günther, 1877)	yellowtail fang blenny	JR	*Trop.IWP	a	10–18 m	u
<i>Meiacanthus lineatus</i>	(De Vis, 1884)	lined fangblenny	JR	*Trop.WP(endemic)	a	3–24 m	u
<i>Omobranchius anolius</i>	(Valenciennes, 1836)	oyster blenny	LH	Temp.SWP	a	<2 m	u
<i>Petrosirtes lupus</i>	De Vis, 1886	brown sabertooth blenny	JR	Trop.SWP	a	<10 m	u
<i>Petrosirtes fallax</i>	Smith-Vaniz, 1976	yellow-lined sabretooth blenny	JR;Wi	Temp.SWP	a	3–24 m	u
<i>Plagiotremus rhinorhynchus</i>	(Bleeker, 1852)	blue-lined sabretooth blenny	JR;Wi	Trop.IWCP	a	3–24 m	u
<i>Plagiotremus tapeinosoma</i>	(Bleeker, 1857)	yellow sabretooth blenny	JR;LH;Wi;W	Trop.IWCP (except Hawaii)	a	3–40 m	u
<i>Xiphias setifer</i>	Swainson, 1839	hairtail blenny	beach fisher	*Trop.IWP	j	<2 m	r
TRIBE SALARINII							
<i>Ecsenius bicolor</i>	(Day, 1888)	bicolor blenny	JR	*Trop.IWP	a	8–24 m	u
<i>Exallias brevis</i>	(Kner, 1868)	leopard blenny	JR	*Trop.IWCP	a	10–18 m	u
TRIPTERYGIDAE							
<i>Enneapterygius rufopileus</i>	(Waite, 1904)	black-cheeked threefin	JR;LH	Subtrop.SWP(endemic)	a	<18 m	c
CALLIONYMIDAE							
<i>Eocallionymus papilio</i>	(Günther, 1864)	painted stinkfish	JR	Temp.IWP	a	5–18 m	u
GOBIESOCIDAE							
<i>Cochleoceps orientalis</i>	Hutchins, 1991	eastern cleaner clingfish	JR	Temp.SWP(endemic)	a	5–18 m	u
<i>Discotrema crinophila</i>	Briggs, 1976	crinoid clingfish	JR(AM)	*Trop.IWCP	a	5–18 m	u
GOBIIDAE							
<i>Afurcagobius tamarensis</i>	(Johnston, 1883)	Tamar River goby	BC(AM)	*Temp.SWP(endemic)	a	1.5 m	u
<i>Amblyeleotris wheeleri</i>	Polunin & Lubbock, 1977	Wheeler's shrimp goby	JR	*Trop.IWCP	a	10–24 m	u
<i>Arenigobius bifrenatus</i>	(Kner, 1865)	bridled goby	BC(AM)	Temp.ISWP (endemic)(estuarine)	a	1–5 m	o
<i>Bathygobius krefftii</i>	(Steindachner, 1866)	Kreft's goby	JR	Temp.SWP	a	5–24 m	u
<i>Fusigobius</i> sp.		blotched sand goby	JR	*Trop.WP	a	15–24 m	u
<i>Gobiodon quinquestrigatus</i>	(Valenciennes, 1837)	five-bar coral goby	JR	*Trop.IWCP	a	5–24 m	u
<i>Istigobius decoratus</i>	(Herre, 1927)	decorated goby	JR	Trop.IWCP	a	8–24 m	u
<i>Paragobiodon echinocephalus</i>	Rüppell, 1828	redhead goby	JR	*Trop.IWCP	a	5–24 m	u
<i>Paragobiodon lacunicolus</i>	(Kendall & Goldsborough, 1911)		JR (AM)	Trop.IWCP	a	10 m	u
<i>Valenciennesia helsdingeni</i>	(Bleeker, 1858)	black-lined sleeper goby	fisher (Richmond River)	Trop.ISWP(estuarine)	a	1–5 m	o
<i>Valenciennesia strigata</i>	(Broussonet, 1782)	pennant glider	JR	Trop.IWP	a	5–24 m	u

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ELEOTRIDIDAE							
<i>Phaethodon grandiceps</i>	Krefft, 1864	flathead gudgeon	BC(AM)	Temp.SWP(endemic)	a	<2 m	u
<i>Hypseleotris compressa</i>	(Krefft, 1864)	empire fish	BC	Subtrop./trop.WSWP	a	<2 m	c
MICRODESMIDAE							
SUBFAMILY PTERELEOTRINAE							
<i>Ptereleotris euides</i>	(Jordan & Hubbs, 1925)	arrow goby	JR	Trop.IWCP	a	2-15 m	u
<i>Ptereleotris heteroptera</i>	(Bleeker, 1855)	spot-tail dartfish	JR	Trop.IWCP	a	15-20 m	u
<i>Ptereleotris monopectera</i>	Randall & Hoese, 1985	monofin dartfish	JR	Trop.IWCP	a	10 m	u
ACANTHURIDAE							
SUBFAMILY ACANTHURINAE							
<i>Acanthurus dussumieri</i>	Valenciennes, 1835	ornate surgeon fish	JR;LH;Wi;W	Trop.IWCP	a	3-40 m	c
<i>Acanthurus lineatus</i>	(Linnaeus, 1758)	blue-lined surgeon fish	JR;LH	Trop.IWCP	j(7 cm)	<3 m	u
<i>Acanthurus mata</i>	Cuvier, 1829	yellow-mask surgeonfish	JR	*Trop.IWCP	sa	<3 m	u
<i>Acanthurus nigricans</i>	(Linnaeus, 1758)	white-checked surgeonfish	JR	*Trop.IWCP	sa	10 m	r
<i>Acanthurus nigrofasciatus</i>	(Forsskal, 1775)	dusky surgeonfish	JR;LH;Wi	*Trop.IWCP	a	1-24 m	c
<i>Acanthurus olivaceus</i>	Forster, 1801	orange-spot surgeonfish	JR	Trop.IWCP	a	3-15 m	o
<i>Acanthurus pyroferus</i>	Kitlitz, 1834	chocolate surgeon fish	JR	*Trop.IWCP	a	3-15 m	u
<i>Acanthurus triostegus</i>	(Linnaeus, 1758)	convict surgeonfish	JR;LH	Trop.IWCP	j(10 cm)	1-10 m	u
<i>Ctenochaetus binotatus</i>	Randall, 1955	two-spot bristletooth	JR	Trop.IWCP	j(10 cm)	5-24 m	u
<i>Ctenochaetus striatus</i>	(Quoy & Gaimard, 1825)	lined bristletooth	JR	Trop.IWCP	j(10 cm)	10 m	u
<i>Paracanthurus hepatus</i>	(Linnaeus, 1766)	blue tang	JR	Trop.IWP	a	5-24 m	u
<i>Zebrasoma scopas</i>	(Cuvier, 1829)	brown sailfin tang	JR	*Trop.IWCP	a	10-15 m	r
<i>Zebrasoma veliferum</i>	(Bloch, 1797)	sailfin tang	JR	*Trop.CWP	a	15 m	r
SUBFAMILY NASINAE							
<i>Naso annulatus</i>	(Quoy & Gaimard, 1825)	short-horned unicornfish	JR	*Trop.IWCP	j	1-24 m	u
<i>Naso lituratus</i>	(Forster, 1801)	orange-spine unicornfish	JR	*Trop.IWCP	a	5-15 m	u
<i>Naso tuberosus</i>	Lacepède, 1802	hump-headed unicornfish	JR	Trop.IWP	a	<10 m	u
<i>Naso unicornis</i>	(Forsskal, 1775)	blue-spine unicornfish	JR;LH	Trop.IWCP	a	1-24 m	o
SUBFAMILY PRIONURINAE							
<i>Prionurus maculatus</i>	Ogilby, 1887	spotted sawtail surgeonfish	JR;LH;Wi;W	Subtrop.SWP(endemic)	a	1-40 m	c
<i>Prionurus microlepidotus</i>	Lacepède, 1804	sawtail surgeonfish	JR;LH;Wi;W	Subtrop.WSWP(endemic)	a	1-40 m	c
ZANCLIDAE							
<i>Zanclus cornutus</i>	(Linnaeus, 1758)	moorish idol	JR;W	Trop.IWCP	a	3-40 m	o
SIGANIDAE							
<i>Siganus doliatus</i>	Cuvier, 1830	pencil-streaked spinefoot	JR	*Trop.IWP	a	10 m	r
<i>Siganus nebulosus</i>	(Quoy & Gaimard, 1824)	black spinefoot	JR;LH;Wi	Trop.IWSWP	a	1-24 m	c
<i>Siganus lineatus</i>	(Valenciennes, 1835)	golden-lined spinefoot	JR	*Trop.WP	a	10 m	r
<i>Siganus spinus</i>	(Linnaeus, 1758)	spiny rabbitfish	LH	*Trop.IWP	a	<2 m	u
SCOMBRIDAE							
<i>Axaxis thazard</i>	(Lacepède, 1800)	frigate mackerel	JR	Trop./Subtrop.CIRCUM	a	pelagic	o
<i>Acanthocybium solandri</i>	(Cuvier, 1831)	wahoo	JR	Trop.CIRCUM	a	pelagic	r
<i>Cybiosarda elegans</i>	(Whitley, 1935)	leaping bonito	JR;W	Trop.IWP	a	pelagic	u
<i>Euthynnus affinis</i>	(Cantor, 1850)	mackerel tuna	JR;W	Trop.IWCP	a	pelagic	u
<i>Grammatoniscus bicarinatus</i>	(Quoy & Gaimard, 1824)	shark mackerel	JR	Trop.IWCP	a	pelagic	o
<i>Katsuwonus pelamis</i>	(Linnaeus, 1775)	skipjack tuna	Wi (fisher)	Trop./Subtrop.CIRCUM	a	pelagic	c
<i>Sarda australis</i>	(Macleay, 1881)	Australian bonito	JR;W	Temp.SWP	a	pelagic	u
<i>Scomber australasicus</i>	Cuvier, 1832	blue mackerel	JR;Wi	Temp.CIRCUM Aust.	a	pelagic	u
<i>Scomberomorus commerson</i>	(Lacepède, 1800)	narrow-barred Spanish mackerel	JR;Wi	Trop.IWP	a	pelagic	u
<i>Scomberomorus munroi</i>	Collette & Russo, 1980	Australian spotted mackerel	JR	Trop.IWP (Aust. & New Guinea)	a	pelagic	u
<i>Scomberomorus semifasciatus</i>	(Macleay, 1884)	broad-barred Spanish mackerel	JR	Trop.IWP	a	pelagic	r
<i>Thunnus albacares</i>	(Bonnaterre, 1788)	yellowfin tuna	JR	Trop/Subtrop.CIRCUM	a	pelagic	r
<i>Thunnus tonggol</i>	(Bleeker, 1851)	northern bluefin tuna	JR	Trop.IWP	a	pelagic	r

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
NOMEIDAE							
<i>Nomeus gronovii</i>	(Gmelin, 1788)	bluebottle fish	beach fisher (Clarks Beach)	Trop.IWCP	j(3 cm)	pelagic	r
<i>Psenes maculatus</i>	(Lütken, 1880)	blue driftfish	JR	Trop.IWCP	j(5 cm)	pelagic	u
ISTIOPHORIDAE							
<i>Makaira indica</i>	(Cuvier, 1832)	black marlin	JR	Trop/Temp.IWCP & eastern Atlantic	a	pelagic	r
BOTHIDAE							
<i>Pseudorhombus jenynsii</i>	(Bleeker, 1855)	small-toothed flounder	JR;BC	CIRCUM Australia (endemic)	a	5–24 m	u
SOLEIDAE							
<i>Pardachirus pavoninus</i>	(Lacepède, 1802)	peacock sole	JR	Trop.IWCP	a	5–24 m	u
<i>Synaptura nigra</i>	Macleay, 1880	black sole	BC	Temp.SWP(endemic?)	sa	<2 m	o
BALISTIDAE							
<i>Balistoides conspicillum</i>	(Bloch & Schneider, 1801)	clown triggerfish	JR	*Trop.IWP	a	10–24 m	u
<i>Pseudobalistes fuscus</i>	(Bloch & Schneider, 1801)	blue-and-gold triggerfish	JR	*Trop.IWP	a	10–15 m	r
<i>Rhinecanthus aculeatus</i>	(Linnaeus, 1758)	white-banded triggerfish	LH	Trop.IWCP	j	<2 m	r
<i>Rhinecanthus rectangulus</i>	(Bloch & Schneider, 1801)	wedge-tailed triggerfish	JR	Trop.IWCP	a	2–15 m	o
<i>Sufflamen chrysopterus</i>	(Bloch & Schneider, 1801)	eye-stripe triggerfish	JR;W	Trop.IWP	a	2–40 m	c
<i>Sufflamen frenatus</i>	(Latreille, 1804)	brown triggerfish	JR;Wi	Trop.IWCP	a	5–24 m	o
MONACANTHIDAE							
<i>Acanthaluteres vittiger</i>	(Castelnau, 1873)	toothbrush leatherjacket	Wi	*Temp.SWP(endemic)	a	15 m	o
<i>Aluterus monoceros</i>	(Linnaeus, 1758)	unicorn leatherjacket	JR	Trop.CIRCUM	a	3–15 m	u
<i>Aluterus scriptus</i>	(Osbeck, 1765)	scrawled leatherjacket	JR	Trop.CIRCUM	a	3–15 m	r
<i>Brachaluteres jacksonianus</i>	(Quoy & Gaimard, 1824)	pigmy leatherjacket	JR;LH;Wi	Temp.ISWP(endemic)	a	5–18 m	o
<i>Cantherhines fronticinctus</i>	(Playfair & Günther, 1867)	spectacled leatherjacket	JR	*Trop.IWCP	a	3–18 m	u
<i>Cantherhines pardalis</i>	(Rüppell, 1837)	honeycomb leatherjacket	JR	Trop.IWCP	a	3–24 m	u
<i>Cantheschenia grandisquamis</i>	Hutchins, 1977	large-scaled leatherjacket	JR;Wi	Subtrop.SWP(endemic)	a	3–24 m	o
<i>Chaetodermis penicilligera</i>	(Cuvier, 1817)	prickly leatherjacket	JR	Trop.IWCP	a	8–18 m	r
<i>Eubalichthys mosaicus</i>	(Ramsay & Ogilby, 1886)	mosaic leatherjacket	JR;Wi	Temp.ISWP(endemic)	a	3–24 m	o
<i>Meuschenia trachylepis</i>	(Günther, 1870)	yellow-finned leatherjacket	JR;Wi	Temp./Subtrop.SWP (endemic)	a	3–24 m	o
<i>Oxymonacanthus longirostris</i>	(Bloch & Schneider, 1801)	beaked leatherjacket	JR	*Trop.IWP	sa (4 cm)	15 m	r
<i>Paraluteres prionurus</i>	(Bleeker, 1851)	mimic leatherjacket	JR	Trop.IWP	a	3–24 m	u
<i>Paramonacanthus otisensis</i>	Whitley, 1931	dusky leatherjacket	Wi	Trop.IWP(endemic)	a	15 m	o
<i>Pervagor alternans</i>	(Ogilby, 1839)	yellow-eyed leatherjacket	JR;Wi	Trop.WSWP	a	5–24 m	o
<i>Pervagor janthinosoma</i>	(Bleeker, 1854)	redtail leatherjacket	JR;Wi	Trop.IWCP	a	5–24 m	o
<i>Scobinichthys granulatus</i>	(Shaw, 1790)	rough leatherjacket	JR;Wi	Temp.ISWP(endemic)	a	5–24 m	u
ARACANIDAE							
<i>Anoplocapros inermis</i>	(Fraser-Brunner, 1935)	eastern smooth boxfish	JR;Wi	Temp.SWP(endemic)	a	8–15 m	u
OSTRACIIDAE							
<i>Lactoria cornula</i>	(Linnaeus, 1758)	long-horned cowfish	JR;LH	Trop.IWCP	a	8–15 m	r
<i>Lactoria diaphana</i>	(Bloch & Schneider, 1801)	round-belly cowfish	JR	Trop.IWCP	a	8–15 m	r
<i>Lactoria fornasini</i>	(Bianconi, 1846)	thorny-backed cowfish	JR;LH	Trop.IWCP	a	1–24 m	o
<i>Ostracion cubicus</i>	Linnaeus, 1758	yellow boxfish	JR;LH;Wi	Trop.IWCP	a	5–24 m	o
<i>Ostracion meleagris</i>	Shaw, 1796	ornate boxfish	JR;Wi	Trop.IWCP	a	5–24 m	u
TETRAODONTIDAE							
<i>Arothron hispidus</i>	(Linnaeus, 1758)	stars and stripes toadfish	JR;LH;BC	Trop.IWCP	a	5–24 m	o
<i>Arothron manilensis</i>	(de Procé, 1822)	striped puffer	LH	Trop.IWP	sa (13cm)	<2 m	u
<i>Arothron mappa</i>	(Lesson, 1830)	map puffer	JR	*Trop.IWP	a	10–15 m	u
<i>Arothron meleagris</i>	(Bloch & Schneider, 1801)	golden puffer	JR	*Trop.IWCP	a	10–15 m	r
<i>Arothron nigropunctatus</i>	(Bloch & Schneider, 1801)	black-spotted puffer	JR	*Trop.IWCP	a	5–15 m	u
<i>Arothron stellatus</i>	(Bloch & Schneider, 1801)	stary pufferfish	JR	Trop.IWCP	a	5–15 m	u
<i>Canthigaster amboinensis</i>	(Bleeker, 1865)	ambon toby	Wi	*Trop.IWCP	a	15 m	u

Scientific name	Author	Common name	Location	Distribution	Maturity	Depth	Abundance
TETRAODONTIDAE — continued							
<i>Canthigaster bennelli</i>	(Bleeker, 1854)	Bennett's pufferfish	JR:LH	Trop.IWCP	a	5–15 m	u
<i>Canthigaster callisterna</i>	(Ogilby, 1889)	clown toby	JR:LH,Wi	Subtrop/Temp.SWP	a	1–24 m	o
<i>Canthigaster coronata</i>	(Vaillant & Sauvage, 1875)	four-barred toby	JR	Trop.IWCP	a	5–15 m	u
<i>Canthigaster valentini</i>	(Bleeker, 1853)	saddled puffer	JR:Wi	Trop.IWCP	a	2–15 m	o
<i>Tetractenos glaber</i>	(Fréminville, 1813)	smooth toadfish	LH:BC	Temp.SWP(endemic)	a	<2 m	o
<i>Tetractenos hamiltoni</i>	(Gray & Richardson, 1843)	common toadfish	BC	Temp./trop.SWP	a	<2m	o
DIODONTIDAE							
<i>Chilomyxus reticulatus</i>	(Linnaeus, 1758)	spotted-fin burrfish	JR	Subtrop.CIRCUM	a	10–15 m	u
<i>Diodon holocanthus</i>	Linnaeus, 1758	freckled porcupinefish	beach wash	Trop./CIRCUM	a		o
<i>Diodon hystrix</i>	Linnaeus, 1759	porcupine fish	JR	Trop./Subtrop.CIRCUM	a	3–24 m	u
<i>Diodon liturosus</i>	(Shaw, 1804)	black-blotched porcupinefish	JR	Trop.IWCP	a	5–15 m	u
<i>Dicotylichthys punctulatus</i>	Kaup, 1855	three-barred porcupinefish	JR:LH:Wi,W	Temp.SWP(endemic)	a	1–40 m	o
MOLIDAE							
<i>Mola ramsayi</i>	(Giglioli, 1883)	southern ocean sunfish	Wi	Temp.CIRCUM Aust.	a	pelagic	u